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C. A. B.
28 APR 1961

PETERSON (G. W.), NULAND (D.), & WEIHING (J. L.). **Test of 4 fungicides for control of Cedar blight.**—*Plant Dis. Reptr*, **44**, 9, pp. 744–746, 1960.

The best control of blight (*Phomopsis juniperovora*) [**36**, 673] secured by E. Neb. agric. Exp. Sta. and Lincoln & Rocky Mtn For. Range Exp. Sta. followed spraying 1- and 2-yr.-old seedlings of Eastern red cedar (*Juniperus virginiana*) with puratized agricultural spray (1½ pints/55 gal. water). Actidione proved phytotoxic, as did dodine at 0·2 lb./10 gal., though not at 0·1.

SAHO (H.). **Studies on needle rust of Pinus strobus L. 2. Causal organism and its alternate host.**—*J. Jap. For. Soc.*, **42**, 2, pp. 62–63, 1960. [Jap.; Engl. summ. *Biol. Abstr.*, **35**, 17, p. 4241, 1960.]

From inoculation experiments (at Tokyo Univ. Forests, Yamabe, Hokkaido) the author concludes that the alternate host of *Coleosporium eupatorii* [**7**, 290], causing needle rust of *P. strobus*, is *Eupatorium sachalinense*, which also causes needle rust of *P. koraiensis*.

VAN ARSDEL (E. P.) & RIKER (A. J.). **Blister rust fungus inoculations on White Pines in mist chambers.**—Abs. in *Phytopathology*, **50**, 9, p. 657, 1960.

During 1952–58 *Pinus strobus* trees were inoculated with *Cronartium ribicola* [**39**, 445, 748] by wrapping portions of branches with telia-bearing *Ribes* leaves at 16° C. and exposing to artificial fog. Periods of 48 hr. or less were insufficient for infection, but after 72 hr. 92% of the trees developed cankers. Inoculations were most successful on young, tender shoots; susceptibility decreased with age.

LEAPHART (C. D.). **A root stain disease of Eastern White Pine.**—*Plant Dis. Reptr*, **44**, 9, pp. 704–706, 3 fig., 1960.

Two small plantations of *Pinus strobus* in the northern Rocky Mountains have been almost entirely destroyed since 1955 by a new root disease. The first symptom, a reduction in terminal growth, is followed by crown discoloration, and when this is complete (yellow, with many upper needles brown) the tree dies, as the root system is by then girdled. The root sap-wood of all affected trees was stained dark chocolate brown. *Verticicladiella* sp. (*Canad. J. Bot.*, **31**, pp. 577–659, 1953) was isolated from the stained xylem and proved to be pathogenic on inoculation to *P. strobus*. In only 1 instance has a native pine, *P. contorta*, been found infected by the root stain disease.

BEGA (R. V.) & SMITH (R. S.). **Thermal death range of sclerotia of Macrophomina phaseoli.**—Abs. in *Phytopathology*, **50**, 9, pp. 628–629, 1960.

Following severe losses from *M. phaseoli* in Calif. nurseries [cf. **39**, 634, 747], particularly among *Pinus lambertiana*, *Pseudotsuga menziesii*, and *Sequoia gigantea*, thermotherapy is being investigated for the control of infection in plants used for reforestation. Individual sclerotia were killed after 2 hr. at 50° C., 8–12 min. at 55°, and ½–2 min. at 60°.

BRANDT (R. W.). **The Rhabdocline needle cast of Douglas Fir.**—*Tech. Publ. N.Y. St. Coll. For.* 84, 66 pp., 22 fig., 1960. [73 ref.]

Following a historical introduction of *R. pseudotsugae* on *Pseudotsuga menziesii* [cf. **32**, 525] and a summary of information on the host, pathogen, and disease, the main part of this publ. is devoted to a study of needle cast in N.Y. State where the

disease 1st appears in Sept.–Dec., depending on the weather; infected needles are cast throughout the year. Two distinct types of apothecia were found, one up to 3–4 mm. long opening at the ends, and the other 10–15 mm. opening longitudinally, but only on the undersurface of the needles; no imperfect state was observed. Spore dispersal continues throughout June–July and both spring and summer shoots are infected. Penetration hyphae entered through the cuticle (on either surface, but chiefly the upper) and all trees, except a few apparently resistant individuals, appear susceptible. The disease spreads from 100–250 ft./yr. Economic control by the use of fungicides does not seem possible and the best prospect is to develop host resistance. The entire Christmas tree industry in the N.E. is severely threatened by this disease.

Suvorov (P. A.). Изучение биологических свойств штаммов **Ganoderma applanatum (Pers.) Pat.** с различных древесных пород. [A study of the biological properties of *G. applanatum* strains from various trees.]—Учен. Зап. Горьковск. Унив. [*Uchen. Zap. Gor'kovsk. Univ.*], *1959*, 1, pp. 4–17, 1959. [Abs. in *Referat. Zh. Biol., 1960*, 16, p. 176, 1960.]

Researches over a number of yr. in the Gor'kiy, Moscow, and Kalinin regions showed that *G. applanatum* [cf. **37**, 587] causes rot of the heart wood of various trees, including pine and spruce, *in vitro*. On nutrient media it grows more slowly than *Fomes fomentarius* [**36**, 670] and *Coniophora cerebella* [*C. puteana*], though it is equally destructive. The different strs. are equally susceptible to NaF.

Diller (J. D.) & Koch (E. J.). **The effects of environmental conditions on the growth of Merulius lacrymans.**—Abs. in *Phytopathology*, **50**, 9, pp. 633–634, 1960.

Test blocks of 13 tree spp. were placed in open cans in 4 different environments with wood chips infected by *M. lacrymans* [**39**, 253]. The av. wt. loss after 2 yr. was 11·1% in the crawl space of a basementless house, 8·8% under leaves in a wood, 7·4% in a root cellar, and 3·7% in a room at 40° F. Heartwood losses averaged 6·4% and sapwood 9·1%.

Royes (Joy) & Loveless (A. R.). **Poria carbonacea (Berk. & Curt.) Cooke as a cause of timber rot in Jamaica.**—*Trans. Brit. mycol. Soc.*, **43**, 3, pp. 571–577, 1960.

Timber of *Brosimum alicastrum* in some newly-built houses in Jamaica was decayed by a tropical brown rot caused by *Poria carbonacea*. On agar 31·5° C. was opt. for growth and the min. R.H. 90% at 30° C.

Kotte (W.). **Krankheiten und Schädlinge im Gemüsebau und ihre Bekämpfung. Dritte, völlig neubearbeitete und erweiterte Auflage.** [Diseases and pests in vegetable cultivation and their control. Third, completely revised and expanded edition.]—xi+514 pp., 8 col. pl., 160 fig., Berlin and Hamburg, Paul Parey, 1960. DM. 50.

The basic layout of the book [**32**, 161] is as before but the plant protection entries have been revised and expanded in the light of recent work, and in Sect. C each subsect. on the pests and diseases of a particular host is now prefaced by a determinative key, which previously appeared at the end of the book. There is a new bibliography of 13½ pp.

Changsri (W.) & Weber (G. F.). **Studies of Alternaria spp. pathogenic on Cruciferae.**—Abs. in *Phytopathology*, **50**, 9, p. 631, 1960.

A. brassicicola [**39**, 160] and *A. brassicae* cause considerable losses of crucifer crops in Fla but *A. raphani* has not been found. The opt. conditions for growth of the

3 pathogens in culture were 24–28°, 20–24°, and 24–28° C. and pH 6–8, 7·1–8·1 and 7·1–8·1, respectively. Zonation in *A. brassicicola* was induced by 3 min. exposure to light or 6 hr. dark alternating from the original source of light. Amino acids in extracts from *A. brassicicola* and *A. brassicae* were similar but differed slightly from those of *A. raphani*.

Klisiewicz (J. M.) & Pound (G. S.). **Studies on control of black rot of crucifers with antibiotics.**—Abs. in *Phytopathology*, **50**, 9, p. 642, 1960.

Immersion in antibiotic solutions (< 3,000 p.p.m.) for 30 min. reduced *Xanthomonas campestris* [**35**, 409] on naturally infected seed to < 1%, and on inoculated seed to < 8%. The bacterium grew on an agar medium containing streptomycin and tetracycline compounds; the latter strongly inhibited bacterial growth on inoculated cabbage seed. Antibiotic sprays applied to cabbage plants once or more before inoculation were more effective than 2 or 3 post-inoculation sprays.

Brune (H.). **Veränderungen des Nährstoff- und Mineralstoffgehaltes von frischem Zuckerrübenblatt mit Köpfen nach Befall mit yellows virus und der Rübenfliege (Pegomyia hyoscyami).** [Changes in the nutrient and mineral substance contents of fresh Sugar Beet leaves with crowns after infection by yellows virus and the Beet fly (*P. hyoscyami*).]—*Zucker*, **13**, 16, pp. 405–411, 1960. [Engl., Fr. summ.]

Recent analyses of material from S. Lower Saxony at the Inst. für Tierphysiologie und Tierernährung, Univ. Göttingen, Germany, are described and tabulated.

Compared with symptom-free leaves and crowns, the dry matter content was appreciably raised by yellows virus infection [cf. below] and total nutrients reduced on account of an increase in crude ash (sand-free). Increases were noted in the amide content and amino-N fraction of the raw protein, especially in the crowns, accompanied by a reduction of solubility in a mixture of pepsin and HCl. The Ca content was increased in relation to that of oxalic acid, while the amount of P was diminished.

The practical consequences of these observations are discussed in connexion with the feeding of dairy cattle.

Handschack (W.). **Untersuchungen des Mineral- und Säurestoffwechsels gesunder und viruskranker Blätter und Rüben von Beta vulgaris L.** [Studies on the mineral and acid metabolism of healthy and virus-diseased leaves and roots of *B. vulgaris*.]—*Zbl. Bakt.*, Abt. 2, **113**, 19–21, pp. 583–599, 4 diag., 4 graphs, 1960.

This contribution from the Inst. für Allgemeine Botanik, Friedrich-Schiller-Univ., Jena, Germany, opens with a detailed account of the chromatographic (silica gel and gradient elution) methods used in studies of the metabolism of healthy and yellows virus-infected sugar beet [see above].

The following are some of the data cited (in mg./g. dry weight for the minerals and fresh for the acids): ash in healthy and diseased leaves 182 and 148, roots 27 and 23; P 33·4 and 37·6, 7·7 and 8·2; Ca 17·8 and 9·8, 1·3 and 1·3; phosphate 8 and 13, 2·4 and 4·5; sulphate 26·5 and 18·7, 5·3 and 1·9; Cl 22 and 22·4, 2·3 and 2·9; oxalic acid 510 and 232, 383 and 165; malic acid 25 and 77, 4·2 and 3·2; and citric acid 53 and 135, 74·7 and 65 [cf. **34**, 121].

Schneider (C. L.). **Occurrence of bacterial blight of Sugar beets in Maryland.**—*Plant Dis. Reptr*, **44**, 9, pp. 742–743, 1960.

Pseudomonas aptata [**26**, 40] was observed for the 1st time in Md causing bacterial blight of sugar beets in a plot at the Plant Industry Sta., Beltsville, in 1959.

HAGEDORN (D. J.). **Testing commercial Pea varieties for reaction to Fusarium root rot, Fusarium solani f. pisi.**—Abs. in *Phytopathology*, **50**, 9, p. 637, 1960.

Pea seeds were sown in a mixture of 14,000 g. white quartz sand, 350 ml. blended spores and mycelium of *F. solani* f. *pisi* [**39**, 756], 350 ml. Czapek's solution, and 700 ml. distilled water and incubated for 30 days at 21° C. Of about 280 vars. tested, less than 1% had a disease index under 25 (0 = all plants healthy, 100 all dead). No var. was immune or highly resistant but Wando was the most tolerant.

CUNNINGHAM (J. L.) & HAGEDORN (D. J.). **Histological studies on penetration of Pea roots by zoospores of Aphanomyces euteiches.**—Abs. in *Phytopathology*, **50**, 9, p. 632, 1960.

Zoospore suspensions (350,000/ml.) of *A. euteiches* [**40**, 69] were prepared by growing mycelial mats in maltose-peptone broth for 4 days at 24° C. and replacing the medium with sterile lake tap water for 2 hr., then with sterile distilled water to cover the mats. Wando pea roots, grown aseptically, were placed in the suspension for 1½–8 hr. The epidermis was penetrated in 2 hr. either between cells, through root hairs, or occasionally directly through the cell wall. Inside the root the mycelium was both inter- and intracellular, and penetration to the 7th cortical layer of cells occurred within 8 hr.

HAGLUND (W. A.) & KING (T. H.). **Sulphur nutrition of Aphanomyces euteiches.**—Abs. in *Phytopathology*, **50**, 9, pp. 637–638, 1960.

The addition of methionine, cystine, and Na thiosulphate at 5, 10, and 20 p.p.m. S to a medium containing D-glucose, L-asparagine, and inorganic salts supported growth of *A. euteiches*. Thiourea, Na bisulphite, metabisulphite, persulphate, and bisulphate were toxic at 20 but not at 5 p.p.m. S; thiourea supported excellent growth at 5 and 10 p.p.m. The reduced form of S was essential for growth. Preliminary results suggest a connexion between the resistance of some pea vars. to *A. euteiches* [cf. above] and S requirement.

PAPAVIZAS (G. C.) & DAVEY (C. B.). **Oospore formation by Aphanomyces euteiches on synthetic media.**—Abs. in *Phytopathology*, **50**, 9, p. 650, 1960.

Abundant oospores were formed by *A. euteiches* [**39**, 645 and above] on a medium containing mineral salts, glucose, thioglycolate, noble agar, and a mixture of amino acids in the proportions found in yeast extract. Vitamins were not essential. The isolates studied varied in their requirements; opt. C/N ratio for 1 was 5/22 and for 2 others 5/6. Oospore production was favoured by an acid reaction.

SKOTLAND (C. B.) & BURKE (D. W.). **A virus of wide host range seed-borne in Phaseolus vulgaris.**—Abs. in *Phytopathology*, **50**, 9, p. 655, 1960.

Some 2–3% of seed from a field of Columbia Pinto beans resistant to bean viruses 1 and 1A [bean common mosaic virus strs.] produced virus-infected plants with symptoms similar to bean common mosaic. Infection did not protect against bean common mosaic virus or virus 2 [bean yellow mosaic virus]. The dilution end-point was 1:10,000–1:50,000, survival *in vitro* 72–96 hr. at 18° C, and thermal death point 65–75° for 10 min. The virus infected *P. lunatus*, *P. acutifolius* var. *latifolius*, cowpea, and *Cicer arietinum*. Systemic infection (leaf mottle, stunting, and necrosis) was noted. Susceptible bean vars. included Great Northern U.of I.123, Early Pink, Blue Lake, Improved Tendergreen, Black Valentine, and Keeney Refugee, while Topcrop, Idaho Bountiful, and Idaho Refugee were immune.

SMALE (B. C.) & MITCHELL (J. W.). **Control of Lima Bean downy mildew with phenacridane chloride and closely related compounds.**—*Plant Dis. Reptr*, **44**, 9, pp. 684–686, 1960.

In greenhouse experiments at U.S. Dept Agric., Beltsville, Md, a 63 p.p.m. spray

of phenacridane chloride (9-(p-*n*-hexyloxyphenyl)-10-methyl-acridinium chloride, Abbot Labs., N. Chicago, Ill.) and 9 closely related compounds gave complete protection to *Phaseolus lunatus* from *Phytophthora phaseoli* [**37**, 619]. The ED_{50} values of the acridinium compounds indicated that under these conditions they were 4–8 times more effective against *P. phaseoli* than maneb.

Allington (W. B.), Moorhead (Ellen L.), & Staples (R.). **Alfalfa mosaic virus in Soybean.**—Abs. in *Phytopathology*, **50**, 9, p. 627, 1960.

Fields of lucerne in E. Neb. frequently have up to 20% symptomless infection by lucerne mosaic virus, and neighbouring soybeans are sometimes infected sporadically, the virus being transmitted by *Macrosiphum pisi* [*Acyrthosiphon pisum*] and causing extreme chlorosis. Under the electron microscope the virus appeared as a small sphere or an extremely short rod [**38**, 236].

Verhoeff (K.). **On the parasitism of Bremia lactucae Regel on Lettuce.**—*Tijdschr. PlZiekt.*, **66**, 3, pp. 133–204, 4 pl., 2 fig., 14 graphs, 1960. [Dutch summ. 70 ref.]

A comprehensive account from the Proefstation voor de Groenten- en Fruitteelt onder Glas, Naaldwijk. Recently there has been a considerable increase in the head lettuce crop in the Netherlands, partly attributable to the rapid development of cultivation in the greenhouse where the autumn crop is particularly susceptible to *B. lactucae*.

The germ tube was found to attach itself to the surface of the leaf by means of a slight appressorium, a thin infection hypha penetrating into the epidermal cell to form a vesicular swelling from which new hyphae arise. Occasionally penetration was observed between two epidermal cells, and once via a stoma [cf. **34**, 697]. When the R.H. was permanently high there was a clear relationship between temp. and incubation period, with the shortest period of about 5 days at about 22° C. At low temp. and low R.H., conidia remained viable for a long time (140 days at 2° and 70%). Liquid water is necessary for germination, which occurred at —3–31° (opt. 4–10°). Germ tubes grew best at approx. 15°. Inoculation tests indicated no physiological specialization among 15 conidial collections. Some lettuce vars. and some *Lactuca* spp. inoculated appeared to possess a high degree of resistance and may prove useful in a breeding programme [cf. **38**, 440]. The fungus may survive unfavourable periods as intercellular mycelium in the leaves. Conidia are considered to be the only means of dispersal. Damage may be increased by the development of *Botrytis cinerea* in the infected leaves.

In the absence of resistant commercial vars. the disease may be held in check by preventive dusting with zineb or with B 56 at 1–1·5 g./sq. m. every 5 or 6 days until 3–4 weeks after transplanting; later infections cause little damage.

Paulus (A. O.), Kendrick (J. B.), & Desjardins (P. R.). **Natural occurrence of Potato virus X in field-grown Peppers in California.**—Abs. in *Phytopathology*, **50**, 9, p. 650, 1960.

Local lesion and serological tests indicated that both the ringspot and necrotic spot strs. of potato virus X occur in plantings of *Capsicum annuum* in coastal counties.

Cook (A. A.). **A mutation for resistance to Potato virus Y in Pepper.**—Abs. in *Phytopathology*, **50**, 9, p. 632, 1960.

Inoculation and breeding experiments established that the resistance of an individual *Capsicum annuum* plant (YRP 10) of a var. normally susceptible to potato virus Y was due to a single recessive allele in the homozygous condition. Progeny of YRP 10 × P 11 (resistant) exhibited resistance to tobacco mosaic virus and susceptibility to tobacco etch virus. It is concluded that the gene designation ey^a for the association of resistances to tobacco etch virus and potato virus Y [**39**, 763] is invalid.

White (J. C.) & Horn (N. L.). **Pathological histology of Tabasco Pepper plants infected with Tobacco etch virus.**—Abs. in *Phytopathology*, **50**, 9, p. 658, 1960.

No histological differences were apparent between healthy and wilted, infected *Capsicum* seedlings when leaf and stem sections were examined. In infected roots the phloem was discoloured and the epidermal and outer cortex cells were collapsed but the xylem vessels were not plugged. When the roots were cut off, wilted plants revived in water.

Kimble (K. A.) & Grogan (R. G.). **Resistance to Phytophthora root rot in Pepper.**—Abs. in *Phytopathology*, **50**, 9, p. 642, 1960.

In greenhouse inoculation tests the *Capsicum annuum* selections P.I. 187331, 123469, 201232, 188476, and 201234 (the best) were rated as resistant to *P. capsici*; the only named var. with fair tolerance was Jalapeno.

Ramsey (G. B.), Smith (M. A.), Wright (W. R.), & Beraha (L.). **Phytophthora rot of Watermelons on the market.**—*Plant Dis. Reptr*, **44**, 9, pp. 692–694, 2 fig., 1960. [6 ref.]

Heavy losses are incurred during shipment of watermelons from Ariz., Calif., and Mexico, mostly due to *P.* spp. [cf. **35**, 879], especially *P. capsici* [**39**, 8]. Infection can occur without previous injury, and spread among melons in contact is very rapid at 70° F. or more, but inoculation caused no decay at 40°.

Winstead (N. N.) & McCombs (C. L.). **Pectinolytic and cellulolytic (Cx) enzyme production by cucurbit anthracnose fungi.**—Abs. in *Phytopathology*, **50**, 9, p. 659, 1960.

All isolates of *Colletotrichum lagenarium* [**39**, 764] races 1, 2, and 3, *C.* sp., and *Glomerella lagenaria* produced pectinolytic (PME and PG) enzymes on media containing pectin. Both pectin and sodium polypectate were hydrolysed to galacturonic acid. Cx activity was highest in inoculated cucumber slices and in media containing carboxymethylcellulose.

Metz (R. W.). **Differential disease development as a measure of entrance and movement of a fungicide within Cucumber seedlings.**—*Diss. Abstr.*, **20**, 10, p. 3937, 1960.

A bio-assay method for evaluating fungicides able to enter and diffuse within host plants was developed at Ohio State Univ. Lesion counts were made on the 1st or 2nd true leaves of cucumber seedlings treated with an antibiotic and then inoculated with *Colletotrichum lagenarium* [**38**, 442] (60,000 conidia/ml. suspension). The movement of pleocidin into the primary leaf was greater when the antibiotic was brushed on the cotyledons and hypocotyl with an 'acid brush' than when sprayed on; brushing with carborundum gave further improvement. There was more movement downwards from the 2nd to the 1st leaves than upwards from 1st to 2nd in sprayed plants. If more than 48-hr. elapsed between application of the antibiotic and inoculation, symptom suppression was impaired.

Okońska-Gwóźdż (Jolanta). **Badanie patogeniczności Colletotrichum orbiculare (Berk. et Mont.) v. Arx na Ogórkach.** [Study on the pathogenicity of *C. orbiculare* in Cucumbers.]—*Biul. Inst. Ochr. Roś., Poznań*, 8, pp. 139–162, 5 fig., 1960. [Russ., Engl. summ. 18 ref. Cyclostyled.]

Cultures of *C. orbiculare* (*C. lagenarium*), used by Inst. Plant Prot., Reguły, Poland, to inoculate cucumber seeds, seedlings and fruits, resulted in up to 100% infection. Seed-borne spores and those in post-harvest debris represented potent sources of inoculum; wind and rain, and also thin-skinned fruits favoured infection. Seed disinfection and destruction of crop debris are recommended.

Peyer (E.). **Die Panaschüre, eine gefährliche Rebenkrankheit.** [Panachure, a dangerous disease of Vine.]—*Schweiz. Z. Obst- u. Weinb.*, **69**, 14, pp. 321–323, 2 fig., 1960.

The symptoms are described from the Eidg. Versuchsanstalt, Wädenswil [cf. **38**, 557; **39**, 767]; the virus is still fairly rare in E. Switzerland but is reaching a rather disturbing level in the west.

Chikviladze (I.). Испытание каптана против мильдью Винограда. [Captan tested against Vine mildew.]—*Sad i Ogorod*, **97**, 6, pp. 73–74, 1959.

In 1956 captan (0·25, 0·5, and 0·75% active substance) was sprayed on vines at the Telavskaya exp. Sta., Inst. Hort., Viticulture, and Wine-making, Georgian S.S.R., on 1, 8, and 18 June, and 4, 18, and 28 July. On 13 June when the disease [*Plasmopara viticola*: cf. **39**, 70] was rampant leaf infection was 4·7, 4·8, and 1·9%, respectively, for the 3 concs., 6·6% for 1% Bordeaux mixture, and 22·2% on untreated vines; on 6 Aug. the corresponding figures were 13·5, 11·8, 7·4, 22, and 67·7%. Berry infection was lowest (6·4%) with 0·75% captan.

Harvey (H. L.). **Powdery mildew or Oidium of Grapes.**—*J. Agric. W. Aust.*, **1**, 8, pp. 747–749, 4 fig., 1960.

An account of the occurrence and control of *Uncinula necator* on vines [**39**, 70].

Cantarelli (C.) & Tafuri (F.). **L'evoluzione dei residui di zineb nel processo di vinificazione.** [Changes taking place in zineb residues during wine-making.]—*Ric. sci.*, **29**, 7, pp. 1416–1423, 1959. [Fr., Engl., Germ. summ. 18 ref. [Received July 1960.]

At Univ. Perugia, Italy, grapes treated with various preparations containing zineb were fermented in open and closed vessels with gas recovery. The residue of zineb found on the grapes was < 1 p.p.m. and at the end of fermentation the greater part of the residue was collected in the lees. Analysis of the volatile S products in the wines gave results agreeing with the content of wines from untreated grapes. No wine from the treated grapes contained CS_2.

New or uncommon plant diseases and pests.—*Plant Path.*, **9**, 3, pp. 111–114, 2 fig., 1960.

W. T. Dale reports that *Uromyces striatus* attacked 4 stands of Du Puits lucerne in Sussex in the autumn of 1959. The rust has only once before been recorded on this host in Britain (*Trans. Brit. mycol. Soc.*, **41**, 401–404, 1958).

In Mar. 1960 H. J. Wilcox observed *Rhynchosporium orthosporum* on stunted plants of *Lolium multiflorum* in Sussex, a new host record for Britain, and subsequently on the same host and on *Agrostis stolonifer* and *Dactylis glomerata* in Wilts.

I. G. Thorpe noted severe infection by *R. secalis* on *L. multiflorum* var. Westerwoldicum in Wilts. in Apr. 1960.

J. H. Hawkins & D. H. Phillips record that in Sept. 1959 the foliage of 2 field crops of carrots at Warboys, Hunts., was so affected by *Oidium* sp. (probably *Erysiphe polygoni*, syn. *E. umbelliferarum*) that from a distance the foliage appeared white.

Jahresberichte der Pflanzenschutzämter 1958. [Annual reports of the Plant Protection Bureaux 1958.]—252 pp., Biologische Bundesanstalt für Land- und Forstwirtschaft, Braunschweig, 1960.

A further account of activities in each of the Länder [cf. **38**, 347].

Annual Report of the Department of Agricultural Research, Federation of Nigeria, for the year 1958–59.—43 pp., 1960. 9*d*. [Cyclostyled.]

In this report [cf. **38**, 655], some of the information in which has been noticed

[cf. **39**, 204], D. G. ROBERTSON (p. 21) states that in *Dioscorea rotundata*, *D. cayennensis*, and, to a somewhat less extent, *D. alata*, the symptoms of the suspected virus disease of yam are vein-clearing and interveinal chlorosis, severe chlorosis with green islands, or faint mottling, and leaf distortion.

J. M. WATERSTON (p. 35) reports that severe symptoms of citrus tristeza virus [map 289] appeared on acid lime trees on sour orange rootstocks in Sept. 1958, 3 yr. after planting, but formal proof of the presence of the virus has yet to be made. Agege 1 sweet orange rootstock trials initiated in 1952 have failed, possibly due also to tristeza.

Report of the Department of Agriculture, N.S.W., for the year ended 30th June, 1959.—144 pp., 16 fig., 1960.

Much of the information in the plant pathology sect. (pp. 79–89), submitted by the biol. Branch, Div. Sci. Serv. [cf. **39**, 72], has been noticed [cf. **39**, 654]. Wheat bunts (*Tilletia foetida* and *T. caries*) continue to be rare owing to adequate seed treatment, but flag smut (*Urocystis tritici*) [*U. agropyri*] is spreading in the susceptible var. Gabo.

Good resistance to potato scab (*Streptomyces scabies*) was shown by the var. Emilia (*Solanum tuberosum* ssp. *andigenum*) in trials on the Central Tablelands.

Tomato drop head wilt virus [**38**, 120] survived for 21 months in dried, powdered tomato leaves.

The rockmelon var. P.M.R. 45, resistant to powdery mildew (*Oidium*) for nearly 20 yr., became heavily infected during 1959 in the lower Murray Area and the M.I.A.

Investigations are in progress to determine whether melon powdery mildew in N.S.W. is caused by *Sphaerotheca fuliginea* or, as previously supposed, by *Erysiphe cichoracearum* [**38**, 115, 556]. Under conditions favourable to the development of *Pseudoperonospora cubensis* the cucumber vars. Palmetto, Ashley, and Stono showed good resistance.

Experimental evidence has been obtained that citrus scaly butt [citrus exocortis virus: **38**, 120] and stunting are probably due to unrelated causes. Yellow ring [**39**, 72], possibly due to incompatibility, has now developed in bitter Seville oranges on *trifoliata* stock. In spray trials against mandarin brown spot [**37**, 134], in which an *Alternaria* sp. appears to be involved, the best control was given by $\frac{1}{2}$ lb. Cu oxychloride+$\frac{1}{2}$ lb. zineb in 40 gal. water (av. 4·25 affected fruits/tree compared with 42/unsprayed tree).

The use of thiram in spray schedules against apple black spot (*Venturia inaequalis*) gave a yield increase of 22% over trees treated with lime-sulphur. No evidence has yet been obtained of the transmission of the virus-like diseases apple measles, green crinkle, and wood tumour, or pear ringworm and fissure bark. The spores of *Sclerotinia fructicola* were trapped daily from 17 Feb., reaching a peak on 25th, and another in Mar., both after falls of rain; high concs. of spores were also detected in Apr., and a few were trapped in May and June. Among the stone fruit viruses believed to be present in N.S.W. are peach rosette mosaic, cherry tatter leaf, cherry mottle leaf, cherry rasp leaf [map 303], and plum line pattern.

Good control of *Cercospora musae* [*Mycosphaerella musicola*] on banana, under favourable infection conditions which caused moderately severe defoliation in plantations not treated, was achieved over 2,400 acres by misting. Ten months after an eradicant spray of 0·1% phenyl mercury chloride a planting of passion fruit was still almost free from brown spot (*Alternaria passiflora*) [**36**, 200]. Sultana grapes at Coomealla yielded a *Sporotrichum* sp., which may have a connexion with black measles [**38**, 121].

Diseases of ornamentals included the commonly occurring *Exobasidium vaccinii* on azaleas [*Rhododendron*], and *Fusarium oxysporum* f. *gladioli*, now the most serious disease of gladiolus corms.

Bureau of Plant Pathology. Bureau of Plant Quarantine, ex Fortieth Annual Report, Department of Agriculture, California, for the period ending 31 December, 1959. —*Bull. Dep. Agric. Calif.*, **49**, 2, pp. 149–161, 1 fig., 1 map, 1960.

G. L. Stout & G. A. Alstatt in the plant pathology report (pp. 149–156) [cf. **39**, 75] state that *Bacillus polymyxa* [cf. **35**, 653] was isolated from a celery leaf spot. Seven chestnut trees infected by *Endothia parasitica* [**37**, 206] were destroyed in San Joaquin county. Pear collapse, characterized by wilted, scorched, and dead leaves, and arrested fruit growth, was observed in many orchards in N. Calif. [cf. **37**, 47]. The occurrence of *Chrysomyxa ledi* var. *rhododendri* on cultivated rhododendrons was new for Calif. *C. piperiana* [**30**, 124], though present in Calif. for many years on both native and commercial rhododendrons, is limited to the coastal counties. Records of interest included *Gymnosporangium libocedri* on pear, on which it is rare, and *Phragmidium rubi-idaei* on fruit as well as leaves of red raspberry [cf. **30**, 25].

E. A. Breech & O. A. Vaughan present the plant quarantine report (pp. 157–161).

Bazan de Segura (C.). **Principales enfermendades de las plantas en el Perú.** [Principal plant diseases in Peru.]—70 pp., Cañete, Asociaciones de Agricultores de Canete e Ica y el Comité de Defensa Técnica del Algodonero de la Sociedad Nacional Agraria, 1959.

Diseases reported on economic plants in Peru [cf. **32**, 592] up to the end of Jan., 1959, are listed under the hosts, the Spanish, English, and Latin names being furnished. Indications for control are given in most instances.

Stahl (Marianne) & Umgelter (H.). **Handbuch des Erwerbsgärtners. Band V. Pflanzenschutz im Blumen- und Zierpflanzenbau.** [Handbook for commercial gardeners. V. Plant protection in flower- and ornamental growing.]—371 pp., 233 fig., Stuttgart, Verlag Eugen Ulmer, 1959. DM. 25. [62 ref.]

This essentially practical manual has 3 sect., the 1st covering in detail control measures and the various pesticides; the 2nd dealing with different types of disease and insect pests; and the 3rd with individual host plants (arranged alphabetically) and their diseases.

Lovrekovich (L.) & Klement (Z.). **Triphenyltetrazolium chloride tolerance of phytopathogenic bacteria.**— *Phytopath. Z.*, **39**, 2, pp. 129–133, 1 fig., 1 graph, 1960. [Germ. summ.]

The growth of 70 phytopathogenic bacteria of 5 gen. was studied on a solid medium containing varying concs. of triphenyltetrazolium chloride (TTC). *Agrobacterium*, *Corynebacterium*, and *Xanthomonas* spp. proved highly sensitive, whereas the *Erwinia* and *Pseudomonas* spp. had a fairly high degree of tolerance. High tolerance is characteristic of some species. *X. stewartii* and *X. uredovorus* [**34**, 439] were more tolerant than other xanthomonads from which, it is stressed, they differ in several other characteristics.

Reinhardt (J. F.) & Powell (D.). **Culture media for viability studies and storage of Erwinia amylovora.**—*Phytopathology*, **50**, 9, pp. 685–686, 1960.

Yeast extract broth was the best of 8 liquid media compared for viability studies on *E. amylovora* at the Dept Plant Path., Univ. Ill., Urbana. Cultures were maintained for 2½ yr. at 3° C. on solid, modified Emerson's medium with 0·1% dextrose at pH 6·8.

Voronkevich (I. V.). О выживаемости в почве бактерий из рода **Erwinia**— возбудителей мягких гнилей растений. [On the survival in the soil of bacteria

of the genus *Erwinia*—causal agents of soft rots in plants.]—*Bull. Soc. Nat., Moscow*, Ser. biol., **65**, 2, pp. 95–105, 2 fig., 1960. [Engl. summ. 1 p. ref.]

Experiments in 1948–50 and 1955–6 showed that the soft rot *Erwinia* spp. are unable to survive for long in soil from which they are not readily isolated. They should, therefore, be considered as true phytopathogenic bacteria, and not semi-saprophytes. They survive for a long time in plant tissues, but die quickly when these are decomposed by rot. Many fluorescent *Pseudomonas* spp. with pectolytic characters (able to cause soft rot) which aid in the decomposition of plant tissues occur in soil. Coliform rot pathogens formed a small proportion of soil isolates; the author considers these to be transitional forms between the saprophytic and plant pathogenic spp. The question of the connexion between the *coli-aerogenes* group and *E. carotovora* in the soil requires further study.

Beltrá (R.). **β-indoleacetic acid and plant tumors of bacterial origin.**—*Rev. latinoamer. Microbiol.*, **2**, pp. 23–32, 1959. [*Chem. Abstr.*, **54**, 17, col. 17565 c, 1960.]

Various biochemical tests at Inst. Jaime Ferrán de Microbiología, Madrid, revealed indoleacetic acid in filtrates of *Agrobacterium tumefaciens* and *Pseudomonas savastanoi* grown in media containing tryptophane, but not in those of *P. pisi*, *P. syringae*, or *P. marginalis*. The production of plant tumours was correlated with secretion of the acid by *A. tumefaciens* and *P. savastanoi*, the other 3 spp. being inactive.

Madelin (M. F.). **Internal fungal parasites of insects.**—*Endeavour*, **19**, 76, pp. 181–190, 2 pl. (7 fig.), 1960. [25 ref.]

A review of the behaviour and physiology of entomogenous fungi, with emphasis on the need for further research to investigate their use for controlling certain insects [cf. below].

Symposium 2: Insect mycology.—Trans. First Internat. Conf. Insect Path. and biol. Control, Prague, 13–18 Aug., 1958, pp. 153–188, 1959.

This symposium includes:

Telenga (N. A.). [The use of muscardine fungi in combination with insecticides in control of insect pests.] (pp. 155–168, 2 pl., 3 graphs.) [Germ. with Russ. summ.] At Inst. Plant Prot., Kiev, U.S.S.R., ground cultures of *Metarrhizium anisopliae* and *Beauveria bassiana* [cf. **39**, 540] at 5 kg./ha.—25% hexachlorane at 7 kg. ha. applied to soil, and of *B. bassiana* at 2–3 kg./ha.+1% suspension of 5·5% DDT, gave an effective control of long-nosed beet weevil (*Bothynoderes punctiventris*) and apple codling moth (*Cydia pomonella*), respectively. Observations were made on pathological changes in the haemolymph of the insects resulting from fungal parasitism.

Kerner (G.). [A mycosis in *Dasychira pudibunda* L. and its use for biological control of other forest pests.] (pp. 169–176, 5 fig.) [Germ. with Russ. summ.] Spores from cultures of *Isaria farinosa* [**36**, 761], assayed by the Inst. Forestry, Eberswalde, E. Germany, against *Lymantria dispar*, *L. monacha*, *Bupalus piniarius*, and *Hyloicus pinastri*, gave a highly effective control, better if applied in dry form than in water suspension. Talc or dried milk as filler accelerated the disease and enhanced the mortality of the insects.

Evlakhova (Mme A. A.). [Some laws concerning fungal epizootics in insects and peculiarities of such an occurrence in the stink-bug.] (pp. 177–180.) [Russ. with Engl. summ.] Observations by All-Union Inst. Plant Prot., Leningrad, U.S.S.R., indicated that the occurrence of mycoses caused by Entomophthoraceae is concentrated in places with favourable temp. and humidity, which serve as

reservoirs of resting spores. The stink-bug (*Eurygaster integriceps*) was attacked by *Spicaria farinosa* [*Paecilomyces farinosus*: cf. **25**, 449] and *Beauveria bassiana*, the latter also parasitizing a wide range of insects sharing the winter shelter of the bug. The larvae of *Chrysopa ventralis* living in symbiosis with *E. integriceps* acted as vectors of the infection. *B. bassiana*, which tolerated 3–30° [C.], was also able to grow saprophytically and form colonies on organic substrates.

Šamšiňáková (Mme A.). [Remarks on the present-day state of insect mycology.] (pp. 181–184, 1 fig.) [Fr. with Russ. summ.] A brief survey advocating the necessity of further studies from taxonomical and practical points of view.

Krczal (H.) **Hinweise zur Abwehr von Verticillium lecanii als Parasit an Passerinia fragaefolii in Gewächshauskulturen.** [Hints on the control of *V. lecanii*, a parasite of *Pentatrichopus fragaefolii* in greenhouse cultures.]—*NachrBl. dtsch. PflSchDienst, Stuttgart*, **12**, 6, pp. 92–93, 1 fig., 1960. [Engl. summ.]

At Inst. für Obstkrankheiten, Heidelberg, *P. fragaefolii*, used in strawberry virus experiments [**39**, 429], is regularly infected by *V. lecanii* in April or May, and in 1958 a severe attack threatened to destroy the colonies. Of 9 fungicides tested, B 500, vitigran, pomarsol, and karathane gave adequate protection when applied to the leaves of *Potentilla anserina* and *Fragaria vesca* before introducing the aphids.

Zubov (M. F.). Заменитель бордосской жидкости. [A substitute for Bordeaux mixture.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 8, pp. 39–40, 1960.

The new Bordeaux mixture substitute [**39**, 422] was assayed at 1% Cu conc. by Ukrainian sci. Res. Inst. Horticulture. It reduced scab [*Venturia inaequalis*] on apple leaves by 20·4 and on fruits by 39·8%, comparable figures for Bordeaux mixture being 19·9 and 35·6%. It also gave good results against vine mildew [*Plasmopara viticola*: cf. **39**, 150].

Rich (A. E.). **Bis-(3,4-dichloro-2(5)-furanonyl)ether, a promising new non-mercurial fungicide which exhibits both protectant and eradicant properties.**—*Plant Dis. Reptr*, **44**, 5, pp. 306–308, 1960.

This compound, also called mucochloric anhydride (General chem. Div., Allied chem. Corp., code No. GC-2466), proved an effective fungicide at New Hamp. agric. Exp. Sta., Durham.

In slide germination tests 1 p.p.m. gave an ED_{95} value against *Sclerotinia fructicola* and an ED_{50} against *Stemphylium sarciniforme*. In the greenhouse at 1,000 p.p.m. it gave 99 100% control of apple scab (*Venturia inaequalis*) and tomato blight (*Phytophthora infestans*). In the field in 1957–8 these results were substantiated, while defoliation from early blight [*Alternaria solani*] on potato and tomato was considerably reduced.

Wagner (H. A.). **The synthesis of a new class of sodium N, N-dialkyldithiocarbamates and their effectiveness as fungicides.**—*Diss. Abstr.*, **21**, 1, p. 45, 1960.

Some previously unreported secondary amines, containing the cyclopropane or cyclobutane ring, were synthesized at Pa State Univ. and tested against 5 unspecified fungi. They exhibited a broad spectrum of activity, ranging from total ineffectiveness to total inhibition of fungal growth.

Pelletier (E. N.) & Palmer (H. C.). **Two new compounds as seed and soil treatments.**—Abs. in *Phytopathology*, **50**, 9, pp. 650–651, 1960.

In comparative tests with standard fungicides Hercules 3944 (5-chloro-4-phenyl-1, 2-dithiol-3-one) and Hercules 4223 (5-chloro-4(*p*-tolyl)-1,2-dithiol-3-one) showed promise as seed and soil treatments for peas, maize, cotton, and cucumber.

Miller (L. P.). **Uptake and innate toxicity of dodine (n-dodecyl-guanidine acetate) to fungus conidia.**—Abs. in *Phytopathology*, **50**, 9, p. 646, 1960.

Conidia of *Aspergillus niger* and *Alternaria oleracea* [*A. brassicicola*] take up 20,000 μg./g. conidia wt. within 5 min.; those of *Glomerella cingulata* only half this amount in 20 hr. The toxicant is not released when treated conidia are removed to distilled water. The uptake and toxicity of dodine are reduced by tergitol-7. The ED_{50} values for *Venturia inaequalis* [cf. **39**, 594], *G. cingulata*, and *Neurospora sitophila* were 2,000–2,500 μg./g.

Miller (L. P.) & Richter (Erna). **Relationship of lipid contents of fungal conidia to uptake of toxicants.**—Abs. in *Phytopathology*, **50**, 9, p. 646, 1960.

The relative uptake of S, glyodin base, dichlone, dodine [cf. above], Ce, Ag, and Hg by conidia of *Aspergillus niger*, *Alternaria oleracea* [*A. brassicicola*], *Glomerella cingulata*, *Monilinia* [*Sclerotinia*] *fructicola*, *Neurospora sitophila*, and *Stemphylium sarciniforme* bore no relation to the lipid contents, which varied from 8·7 to 26·4%.

Richardson (L. T.) & Thorn (G. D.). **Microbiological degradation of thiram.**—Abs. in *Phytopathology*, **50**, 9, pp. 651–652, 1960.

Colorimetric and spectrophotometric determinations and bioassays of aqueous thiram solutions buffered at pH 7·3 and shaken with *Glomerella cingulata* spores showed that the thiram was reduced to the dimethyldithiocarbamate ion at a rate depending on the relative concs. of spores and fungicide. Dead or mechanically injured spores were ineffective. Neither thiram nor its reduced form was taken up by normal spores. When there were sufficient spores to reduce the thiram rapidly, viability was recovered later. In the presence of Cu^{++} ions part of the dimethyldithiocarbamate was precipitated as the insoluble 1:2 Cu complex and part taken up by the spores, as the 1:1 Cu complex [cf. **34**, 534].

Siegel (M. R.) & Crossan (D. F.). **Effect of copper and glyodin fungicides on amino acid and sugar content and oxygen use of Colletotrichum capsici.**—*Phytopathology*, **50**, 9, pp. 680–685, 1960.

In further work [**40**, 25] at Dept Plant Path., Univ. Delaware, Newark, sublethal amounts of $CuSO_4$ and glyodin caused a reduction in O uptake by *C. capsici* in a liquid, synthetic medium, and a decrease in the reserve sugars, particularly glucose, stored in the mycelium. The number of free amino acids was reduced by $CuSO_4$ and that of bound amino acids by glyodin. Paper chromatography also revealed that certain specific amino acids were missing, reduced, normal, or increased in amount.

Johannes (H.) & Fuchs (W. H.). **Zur Ermittlung der Phytotoxizität von Pflanzenschutzmitteln.** [A phytotoxicity test for plant protectants.]—*NachrBl. dtsch. PflSchDienst, Stuttgart*, **12**, 6, pp. 82–85, 5 fig., 1960. [Engl. summ.]

Bean seed (*Phaseolus vulgaris* var. Saxa) treated with a thiram preparation is germinated in boxes of damp compost and after approx. 8 days uniform seedlings are potted in lots of 5. When the primary leaves have just unfolded, their outline is traced on paper. The plants are then sprayed under standard conditions with the test fungicide. After approx. 1 week in the greenhouse, when the surface growth of the primary leaves is completed, the leaves are detached and the surface area is recorded. This test is recommended for assessment of the effects of fungicides which produce no lesions or obvious changes, but may affect growth.

Another test is recommended for comparison of compounds causing lesions or obvious changes. Saxa seedlings are cut just above the cotyledons before the primary leaves have reached full size. The stem is then placed in tap water and the

leaves sprayed under standard conditions. After 48 hr. they show various degrees of wilting or drying out, which are an indication of the phytotoxicity of the compound.

Velitskiĭ (I. N.). Жижеразбрасыватель РЖ-1,7 для опрыскивания полевых культур. [Sprayer RZh-1·7 for spraying field plantations.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 8, pp. 23–24, 2 fig., 1960.

A short description of a machine developed by Mechanisation Lab., All-Union sci. Res. Inst. Plant Prot., for herbicidal, fungicidal, and pesticidal spraying.

Grotte (M. G.). Универсальный садовой брандспойт. [Universal orchard fire pump.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 8, pp. 24–25, 3 fig., 1960.

A modification of this apparatus, constructed by Ukr. Inst. Mechanisation Electrification Agric., is described and its adaptations for the use in spraying orchards, vineyards, hop gardens, and parks are discussed.

First International Agricultural Aviation Conference, Cranfield, England, 15th–18th September, 1959. —429 pp., 64 graphs, 43 fig., The Hague, International Aviation Centre, [1960]. 50*s*.

An interesting account by Sir Miles Thomas of the history of agricultural aviation prefaces this collection of 50 papers (all summarized in French), delivered in 11 sessions at the Conference, which was arranged by O.E.E.C. The following contributions are of more particular interest to plant pathologists.

D. Hunnam & C. R. Dash (Murphy chem. Co. Ltd., England). **Investigations into the control of pests and diseases on Apples by aerial spraying during the season 1959** (pp. 49–58). Full commercial spraying programmes based on the use of Tiger Moth aircraft with 2 or 4 'micronairs', and a helicopter with a boom are described. It seems likely that only systemic materials will be fully successful in view of the wide range of pests and diseases and the density of the canopy.

G. J. Rose (Britten-Norman Ltd., Bembridge, I. of W.). **A preliminary note upon orchard spraying trials with aircraft in the United Kingdom** (pp. 59–64). Difficulties noted include lack of large enough areas suitable for statistical experiments. Coverage of the lower branches falls to $\frac{1}{3}$ of that of the upper canopy as the season advances, but may still suffice.

R. J. Courshee (National Institution for agric. Engineering, Silsoe, England). **Experiments on applying copper for the control of Potato late blight** (pp. 70–78). Small-scale experiments suggest that spores of [*Phytophthora infestans*] can germinate in a light dew which might not cause a Cu deposit to become redistributed over the crop surface. Under such conditions the initial spray cover must be complete if full control is required, and low-volume spraying is inferior to full-cover spraying for these particular conditions, which occur frequently, but do not often coincide with periods of heavy spore deposition. Use of high- or low-volume spraying must therefore be related to weather conditions. The best coverage obtainable in practice, however, protects only 27% of the leaf surface unless there is redistribution of the Cu by rain.

J. K. Eaton (Woodstock agric. Res. Centre, Sittingbourne, Kent). **Review of materials intended for aerial application and their properties** (pp. 92–102). Spray application techniques are discussed with particular reference to the factors influencing the choice between ground and aerial applicators, and also the advantages and disadvantages of various formulations suitable for application from the air. Successes in the aerial application of pesticides and fertilizers in various parts of the world are reviewed.

Rapley (R. E.). **Modification of the windmill braking system on micronair equipment to hydraulic operation.**—*Agric. Aviat.*, **2**, 3, pp. 91–94, 4 fig., 1960.

A note from Colonial Pesticides Res. Unit, Arusha, Tanganyika, describing difficulties associated with a Bowdenex cable-operated brake fitted to the windmill on 'Micronair' equipment in an Auster J 5 G aircraft, and giving details of a satisfactory hydraulically operated modification.

Cruickshank (I. A. M.) & Perrin (Dawn R.). **Isolation of a phytoalexin from Pisum sativum L.**—*Nature, Lond.*, **187**, 4739, pp. 799–800, 1960.

The endocarp of detached opened pea pods inoculated at Div. Plant Industry, Canberra, with a spore suspension of *Sclerotinia fructicola* [cf. **38**, 243] produced a liquid containing a phytoalexin which had fungistatic effect on *S. fructicola* at an ED_{50} near 10^{-4} M. The same substance, for which the name pisatin was proposed, was also obtained by inoculation with *Ascochyta pisi* [cf. **39**, 362], *Cladosporium* sp., *Phoma lingam*, *Septoria api*, *Erysiphe cichoracearum*, *Peronospora tabacina*, and *Uromyces fabae*, and from living pods naturally infected by *A. pisi*. Analogous extracts from *Phaseolus vulgaris* and *Cucumis sativus* showed similar antifungal properties which, however, were not due to pisatin.

Developments in industrial microbiology. Vol. I.—267 pp., 26 fig., 25 graphs. New York, Plenum Press, 1960. $7.50.

The greater part of this vol. (16th General Meeting of the Soc. Industrial Microbiol., State Coll., Pa. 1959), the 1st of an annual series, is concerned with work in the field of applied microbiological research.

Catherine G. Duncan (Forest Products Lab., Forest Service, U.S. Dept Agric.), **Deterioration of wood by terrestrial ascomycetes and fungi imperfecti** (pp. 148–156), gives a survey of her work on soft rot [**39**, 750], covering the environments in which it has been observed; the wood spp. attacked; the macroscopic and microscopic appearance of affected wood; the genera of fungi imperfecti and ascomycetes involved; the production of such rotting under laboratory conditions; its physiological characteristics; and the chemical nature of affected wood.

S. P. Meyers & E. S. Reynolds (Marine Lab., Univ. Miami), **Cellulolytic activity of lignicolous marine ascomycetes and deuteromycetes** (pp. 157–168), describe work already noted in part [**40**, 155]. An increase in total reducing sugars and the specific production of glucose from carboxymethylcellulose and Walseth cellulose were used as indexes of fungal hydrolysis of cellulose and cellulosic materials in the substratum.

S. Rich (Conn. agric. Exp. Sta., New Haven), **Presidential introduction to the section on fungal metabolism and fungicides** (pp. 169–170), stresses the possibilities of a proper physiological approach to an understanding of fungicidal action.

H. D. Sisler & B. W. Coursen (Dept Bot., Univ. Md), **Effect of cycloheximide (actidione) on the metabolism and growth of fungi** (pp. 181–186), review the properties of the antibiotic.

R. G. Owens (Boyce Thompson Inst. Plant Res. Inc., Yonkers, N.Y.), **Effects of elemental sulphur, dithiocarbamates, and related fungicides on organic acid metabolism of fungus spores** (pp. 187–205), reports that Na_2S, Na_2S_x, thiram, and ferbam, or something derived from them, have certain similar properties which are reflected in their ability to inactivate at least one enzyme in the metabolic pathway from acetate to citrate. Possible modes of action of zineb, nabam, maneb, and isothiocyanate are discussed.

C. L. Porter (Dept biol. Sciences, Purdue Univ.), **Presidential address. The past and future of the Society for Industrial Microbiology** (pp. 261–267), comments, *inter alia*, on existing chaos in the classification of the fungi imperfecti.

Pflanzenschutzbestimmungen im Ausland. Pflanzenschutzbestimmungen in Deutschland. Pflanzenschutzbestimmungen im Ausland. [Plant protection regulations abroad. Plant protection regulations in Germany. Plant protection regulations abroad.] —*Amtl. PflSchBestimm.* N.F., **14**. 1, pp. 1–48; 2, pp. 49–76, 76–84, 1960.

These publications follow the usual lines [cf. **39**, 384].

Plant quarantine's unusual interceptions. *Orchard., N.Z.*, **33**, 8, p. 247, 1960.

These included brown rot [*Sclerotinia fructigena*], not present in N.Z., on apples from Bulgaria: citrus canker [*Xanthomonas citri*] on oranges from Thailand [cf. **35**, 544; **39**, 276]; and black spot [*Guignardia citricarpa*], not occurring in N.Z., on oranges from Australia [cf. loc. cit.; **37**, 585].

Mészöly (G.). **Rezisztenciára-nemesítés feladatai és módszerei.** [Tasks and methods in breeding for resistance.] *Mag. Tud. Akad. Agrár. Oszt. Közl.*, **14**, 1–3, pp. 195–218, 1958.

With discussions by various authors (pp. 209–218).

Lipaeva (Mme L. I.). Генетика устойчивости растений к инфекционным болезням и насекомым-вредителям. [The genetics of plant resistance to infectious diseases and insect pests.] *Bull. Soc. Nat., Moscow*, Ser. biol., **65**, 2, pp. 121–134, 1 fig., 1960. [Engl. summ. 1 p. ref.]

Following a review of the literature in relation to the problem of increasing the total level of resistance in cultivated plants by selection, the topics dealt with include genetical resistance analysis (Mendelistic and cohesion ratio), localization of gene resistance in particular chromosomes, radiogenetics and radioselection in relation to resistance, remote hybridization, and the genetics of parasitic micro-organisms and their relationship to the host plant.

Gregory (P. H.). **Outdoor aerobiology.**—*Endeavour*, **19**, 76, pp. 223–228, 4 fig., 1960. [9 ref.]

Recent research on the sampling and investigation of air-borne spores [**38**, 319; **39**, 382; **40**, 34, *et passim*], bacteria, and pollen is reviewed.

Talieva (Mme M. N.). О реакции растительной ткани на фитотоксины. [On the reaction of plant tissue to phytotoxins.] —Бюлл. глав. бот. Сада, Москва [*Byull. glav. bot. Sada, Moskva*], *1959*, 36, pp. 61–66, 2 fig., 1960.

Filtrates of 10-day-old cultures of *Fusarium lycopersici*, *Botrytis cinerea*, and *Rhizopus nigricans* [*R. stolonifer*] were tested for phytotoxicity on wounded attached and detached leaves of *Aegopodium podagraria*, elm, apricot, and apple in moist chambers. Within 2–3 days *R. stolonifer* and *B. cinerea* toxins had caused brown, necrotic spots on the detached leaves of all the spp., but *F. lycopersici* only on *A. podagraria*, which, along with apricot, proved generally more sensitive than elm and apple. The necrotic areas grew more slowly in the light than in the dark. The toxic effect was associated with a decline or disappearance of ascorbic acid, supposedly owing to decreased photosynthesis, and with an increase in peroxidase, cytochromoxidase, and polyphenoloxidase activity. The necrotic areas remained localized.

Staples (R. C.) & Burchfield (H. P.). **Protein synthesis by nongerminated fungal spores including uredospores of the Bean rust fungus.**—Abs. in *Phytopathology*, **50**, 9, p. 656, 1960.

From a study of the accumulation of labelled C^{14} in the protein of some fungus spores it is suggested that an aspect of obligate parasitism, as in *Uromyces phaseoli* [*U. appendiculatus*], might involve their rapid loss of a mechanism for protein synthesis.

Monson (A. M.). **Movement of radioisotopes in Rhizoctonia solani.**—Abs. in *Phytopathology*, **50**, 9, p. 646, 1960.

Hyphae of *R.* [*Corticium*] *solani* transported Zn^{65}, P^{32}, Sr^{89}, and S^{35} [cf. **39**, 219]. When drops of isotope were placed on different parts of the thallus, P^{32} was transferred from older hyphae to growing tips and vice versa with equal ease.

Hagimoto (H.) & Konishi (M.). **Studies on the growth of fruit body of fungi. II. Activity and stability of the growth hormone in the fruit body of Agaricus bisporus (Lange) Sing.**—*Bot. Mag., Tokyo*, **73**, pp. 283–287, 4 fig., 1960. [Jap. summ.]

In further studies at Lab. appl. Bot., Kyoto Univ. [cf. **39**, 460], the growth hormone in *A. bisporus* diffused from the gills into an agar gel and was dialysable from an aqueous solution through a cellophane membrane. The hormone was soluble in ether, acetone, ethanol, and water, but not in petroleum ether or benzene. It withstood boiling for 1 hr. in N HCl or N NaOH. This hormone was distinct from β-indole-3-acetic acid and ineffective in the *Avena*-test. Extracts from *Coprinus macrorhizus* f. *microsporus*, *Hypholoma fasciculare*, and *Armillaria matsutake* [cf. below] also influenced the growth of the fruit body of *Agaricus bisporus*.

Hiromoto (K.). **Isolation and pure culture of the mycelia of Armillaria matsutake S. Ito et Imai, the most important edible mushroom in Japan.**—*Bot. Mag., Tokyo*, **73**, pp. 326–333, 1 pl. (7 fig.), 2 fig., 1960. [Jap. Abs. from Engl. summ.]

At Kumage-Minami High Sch., Yamaguchi Prefecture, a mycelial culture of *A. matsutake* [cf. above] was readily prepared by inoculating agar decoctions of pine needles or their extract, or of rotten leaves, with the spores. pieces of gill being satisfactory. No differences were observed between uni- and bi-nucleate hyphae. It is suggested that in order to produce the characteristic odour a certain ingredient is necessary in the culture medium.

Bernát (J.). **Mikroflóra Smrekoných porastov.** [The microflora of Spruce stands.] —*Acta Fac. Rer. nat. Comen., Bratislava*, Bot., **2**, 7–9, pp. 343–353, 1958. [Russ., Germ. summ. 20 ref. Received Sept. 1960.]

In 8 soil samples from 3 different localities in Czechoslovakia the total counts for moulds, actinomycetes, bacteria, bacilli, and aerobic cellulose decomposers were higher in podzol than high-mountain soils. Cellulose decomposers in the latter were predominantly *Dematiaceae*, in podzol also *Penicillium* spp. and others. The bacteria : *Bacillus* ratio was lower in podzol soil than in high-mountain, which is also characterized by a relatively high representation of *Penicillium* and low of *Mucor* and *Fusarium*.

Taber (W. A.). **Evidence for the existence of acid-sensitive actinomycetes in soil.**—*Canad. J. Microbiol.*, **6**, 5, pp. 503–514, 1960.

Of 1,269 actinomycetes isolated from various soils at Prairie Regional Lab., Saskatoon, 107 were acid-sensitive and unable to grow at pH 6·2; they were isolated from 9 of 10 alkaline soils and 1 of 6 acid soils.

Göbelez (M.). **Observations sur quelques champignons parasites nouveaux ou peu connus de la Turquie.** [Notes on some new or little known parasitic fungi of Turkey.]—*Phytopath. Z.*, **39**, 1, pp. 94–98, 3 fig., 1960. [Germ. summ.]

A description from Lab. Rech. Agron., Fabriques à Sucre Eskisehir, of *Alternaria sesami* [**39**, 607] (seed-borne) on sesame and 3 new spp.: *Helminthosporium apii* Göbelez on celery seeds (spores 45–46 × 9–13 μ, 5–8-septate), *Septoria styracis* Göbelez on *Styrax officinalis*, and *Septoria ulicis* Göbelez on *Ulex* sp.

Ul'yanishchev (V. I.). Микофлора Азербайджана [The mycoflora of Azerbaijan. Vols. 2 & 3.]—444 pp., 138 fig., 1959; 253 pp., 100 fig., 1960. Baku, Publishers of the Acad. Sci. Azerbaijan S.S.R. Roubles 28; 15.60.

Succeeding vol. 1 of 1952, devoted to smuts, these 2 vols. deal with rust fungi, 452 spp. of which are described. Based on material at the Inst. Bot. Acad. Sci., Sta. Plant Prot., and S.M. Kirov's State Univ., of the Azerbaijan S.S.R., Bot. Inst. Acad. Sci. U.S.S.R., and All-Union Inst. Plant Prot., the monograph has a wider coverage than Azerbaijan, including also rusts in other parts of the U.S.S.R. and elsewhere. An introductory sect. (2, pp. 7–94) deals with geographical distribution (locality, hosts, altitude, and vegetation zones) and general characteristics of rust fungi. The rest covers the Melampsoraceae and Pucciniaceae. Detailed identification keys to the 22 gen., bibliography (7 pp.), and indexes of Russ., Azeri, and Latin names are appended.

Dzhafarov (S. A.). Грибы из рода **Podosphaera,** паразитирующие на диких плодовых деревьях в лесах Талыша Азербайджанской ССР. [Fungi of the genus *Podosphaera* parasitizing wild fruit trees in the Talȳsh forests of Azerbaijan.] Изв. Акад. Наук Азерб. ССР [*Izv. Akad. Nauk Azerb. S.S.R.*], Ser. biol. agric. Sci., *1959*, 4, pp. 43–50, 1959. [Azeri summ.]

The genus is widely distributed in the republic, especially in the Lenkoran zone. Two spp. only are described (*P. oxyacanthae* with its f. spp. *cydoniae* and *crataegi* and *P. tridactyla*), with synonyms, collecting sites, and distribution in U.S.S.R.

Dzhafarov (S. A.). Представители грибов рода **Uncinula** Lév. на древесно-кустарниковых породах Ленкоранской зоны и некоторые моменты в истории их изучения в Азербайджане. [Representative fungi of the genus *Uncinula* on trees and shrubs in the Lenkoran zone and some incidents in the history of their study in Azerbaijan.]—Изв. Акад. Наук Азерб. ССР [*Izv. Akad. Nauk Azerb. S.S.R.*], Ser. biol. agric. Sci., *1959*, 5, pp. 65–71, 1959. [Azeri summ.]

Specimens collected in Azerbaijan, especially in the Talȳsh, in 1935–8 and 1944–56 included *Uncinula clandestina* f. *ulmi-foliaceae*, *U. salicis*, *U. necator*, *U. prunastri*, and *U. aceris*, which are described with details of collecting sites. *U. necator* [**39**, 368] was found on both *Vitis silvestris* and *V. vinifera* throughout the Lenkoran zone July–Oct. 1935–8 and 1952–6.

Orcival (J.). **Étude expérimentale des cycles de Coleosporium melampyri (Tulasne) et de Coleosporium euphrasiae (Schum.) Winter.** [Experimental study on the cycles of *C. melampyri* and *C. euphrasiae*.]—*C.R. Soc. Biol., Paris*, **154**, 4, pp. 816–819, 1 graph, 1960.

The uredo- and teleutospore dimensions of these rusts, measured at Fac. Sci., Toulouse, varied with the host. Thus, for *C. melampyri* on *Melampyrum pratense* uredospore lengths were 16·5–24·38 [–?] and on *Odontites lutea* 15·5–22–32·5 μ, their widths being 10–16·5–21·5 and 11–15·5–20 μ; the corresponding figures for the teleutospores were 41–75–94·5 and 42–69–85·5 μ, and 10·5–18–31·5 and 10·5–18–30 μ. For *C. euphrasiae* the uredospore lengths on *Euphrasia officinalis* were 17–23·5–34 and on *Rhinanthus crus-galli* 16–25–35 μ, and their widths 13–19–28 and 12·5–19–27·5 μ; the corresponding measurements for teleutospores being 48–73·5–96 and 45–73·5–93 μ, and 12–19·5–33 and 12–21–33 μ.

Cross-inoculations demonstrated the capacity of *C. melampyri* to form aecidia on maritime pine (*Pinus pinaster*), which must therefore be regarded as a potential host. Uredospores of *C. euphrasiae* infected *O. lutea*.

Savage (E. J.), Clayton (C. W.), & Gallegly (M. E.). **Production of oospores by inter- and intraspecific pairings within the genus Phytophthora.**—Abs. in *Phytopathology*, **50**, 9, p. 653, 1960.

In pairing experiments an isolate of *P. capsici* from N. Mex. formed oospores with *P. infestans* type A1 [**40**, 62] but not with type A2, while an isolate from N. Carol. and one from Calif. reacted with type A2. Oospores were formed when the N. Mex. *P. capsici* was paired with the N. Carol. and Calif. isolates, but not when these 2 were paired with each other. Three isolates of *P. parasitica* from Calif. formed one group, and 4 from Greece and 1 from Calif. another. Preliminary studies indicate similar groups in *P. cryptogea* [**33**, 170].

Nelson (R. R.). **The relationship of conidial morphology and interspecific fertility in the genus Helminthosporium.**—Abs. in *Phytopathology*, **50**, 9, pp. 648–649, 1960.

In this study of 14 *H.* spp., 6 with *Cochliobolus* perfect states [cf. **40**, 30], 5 distinct classes were distinguished on the basis of shape and size of conidia. Of 23 interspecific crosses, 12 produced viable ascospores, 9 of these being between species with similar conidia, while 9 of the 11 sterile crosses were between isolates differing in conidial morphology. Of the 15 possible crosses between the *C.* spp., 3 produced ascospores, while of the 48 between the *C.* spp. and the 8 *H.* spp. with no known perfect state, 6 were fertile.

Nelson (R. R.) & Hebert (T. T.). **The inheritances of pathogenicity and mating type in crosses of Helminthosporium carbonum and Helminthosporium victoriae.**—Abs. in *Phytopathology*, **50**, 9, p. 649, 1960.

From a study of ascospore isolates from crosses between the 2 spp. [cf. above] it was concluded that pathogenicity in each is controlled by a single gene. Mating type and pathogenicity were inherited independently. Progeny from *H. carbonum* race 2 × *H.* [*Cochliobolus*] *victoriae* segregated 1:1 for mating type. Of the 196 ascospore isolates from *H. carbonum* race 1 × *C. victoriae* only 37 exhibited backcross fertility, 17 of these being fertile with both parents.

Domsch (K. H.) & Schicke (P.). **Erfolgskontrolle fungizider Bodenbehandlungen.** [Test of success of fungicidal soil treatments.]—*NachrBl. dtsch. PflSchDienst, Stuttgart*, **12**, 8, pp. 121–124, 3 fig., 1960. [Engl. summ.]

At Inst. für Getreide-, Ölfrucht-, und Futterpflanzenkrankheiten, Kiel-Kitzeberg, Germany, a method was devised for introducing active cultures of test fungi into soil in such a form that they could be retrieved and examined after the soil had been treated with fungicides [**40**, 78]. Foam rubber was chosen as a substrate capable of supporting fungal growth without being destroyed, while being readily penetrable by the fungicide. Pieces 4 × 15 × 15 mm. were moistened with undiluted carrot sap, sterilized at 1·5 atmospheres for 6 min., then transferred aseptically in batches of 10 to sterile Petri dishes, to which 10 ml. of carrot sap was added. Slow-growing fungi were introduced as a spore suspension with the carrot juice, others as agar inoculum between the pieces of rubber. Ten days sufficed to permit establishment of *Fusarium culmorum*, *Pythium* sp., *Rhizoctonia* [*Corticium*] *solani*, *Sclerotinia sclerotiorum*, *Sclerotium rolfsii*, *Thielaviopsis basicola*, and *Verticillium dahliae* in the rubber. The pieces were held for convenience in packets of plastic gauze (Saran-Gittergewebe): 2 pieces 25 × 5 cm. joined by 3 sides and then sewn to make 6 separate compartments into which the rubber pieces are slipped enables 6 different fungi to be used at the same time.

Clarke (J. H.) & Parkinson (D.). **A comparison of three methods for the assessment of fungal colonization of seedling roots of Leek and Broad Bean.**—*Nature, Lond.*, **188**, 4745, pp. 166–167, 1960.

At Hartley bot. Labs., Univ. Liverpool, isolates were obtained from roots of 30–35-

day-old plants, thoroughly washed in tap and then in sterile water 10 times for 2 min., by plating the root material on Czapek-Dox+yeast extract agar (pH 5), incubating at 25° C. for 3 days, and then storing at room temp. With leek direct plating of root segments [**35**, 34] gave more isolates than root maceration [**33**, 505] or fragmentation [**38**, 577], whereas with broad bean the best method was maceration. These results suggest that maceration and fragmentation may release fungicidal or fungistatic substances (possibly diallyl sulphides) from leek.

Ward (E. W. B.) & Colotelo (N.). **The importance of inoculum standardization in nutritional experiments with fungi.**—*Canad. J. Microbiol.*, **6**, 5, pp. 545–556, 5 graphs, 1960.

At Plant Path. Lab., Canada Dept Agric., Edmonton, Alta, the age of the parent culture affected the growth of the low-temperature basidiomycete isolated from lucerne [**39**, 26] in both complete and vitamin-free media. NaCl solution, used as a suspending medium for homogenates, was inhibitory, but length of time of homogenizing had no significant effect. Dry wt. increased with increasing inoculum up to a limit. It is emphasized that a standard procedure for preparation of inoculum must be adopted to ensure quantitatively reproducible results.

Hansen (H. P.). **Simple designations of Potato-infecting and other viruses in accordance with the periodical system of plant and animal virus interrelationships.**—*Amer. Potato J.*, **37**, 6, pp. 187–202, 1960. [47 ref.]

A system of virus nomenclature [cf. **38**, 331] is described in detail. 'Generic' names are formulae of symbols representing (a) means of direct transmission, (b) vector relations, and (c) particle type. A key to the symbols involved and the derived names of a number of potato and other viruses are presented.

Steere (R. L.). **Morphological differentiation of 'spherical' viruses by electron microscopy.**—Abs. in *Phytopathology*, **50**, 9, p. 656, 1960.

By means of several techniques in the preparation of virus suspensions each particle of turnip yellow mosaic virus was shown to be composed of 12 'spherical' sub-units; tobacco ringspot virus is a polyhedron which tends to become distorted when air-dried; [bean] pod mottle virus is a more rigid polyhedron; and tomato bushy stunt virus, while nearly 'spherical', has flat surfaces when freeze-dried.

Paul (H.-L.). **Bedeutung und Technik der Reindarstellung von Pflanzenviren.** [The significance and technique of the pure preparation of plant viruses.]—*NachrBl. dtsch. PflSchDienst, Stuttgart*, **12**, 6, pp. 88–90, 1960. [Engl. summ.]

A general, critical note on current methods from Inst. für landwirtschaftliche Virusforschung, Brunswick.

Hidaka (Z.) & Tomaru (K.). **Vacuum freeze-drying of Tobacco leaf tissues infected with Cucumber mosaic virus.**—*Virology*, **12**, 1, pp. 8–13, 1960.

At Lab. Plant Path., Hatano Tobacco Exp. Sta., Japan, pieces of infected leaves (minus the midrib) of Bright Yellow tobacco 8–10 days after inoculation were frozen in an acetone dry-ice bath, vacuum dried at about 10^{-4} mm. Hg, and stored in sealed or open ampoules at 0·5° C. in a refrigerator, the open ones being in a desiccator with $CaCl_2$. Cowpea inoculation [cf. **32**, 164] indicated that the virus maintained its activity fairly constantly when kept in this way, though material in open ampoules was slightly less active after 26 days than the sealed. Inoculum obtained with a mortar and pestle was more active than with a homogenizer.

Cochran (G. W.), Welkie (G. W.), & Chidester (J. L.). **Direct infra-red spectral analysis of the Cucumber mosaic virus infection process.**—*Nature, Lond.*, **187**, 4742, pp. 1049–1050, 2 graphs, 1960.

At Utah State Univ., Logan, cotyledons of cucumber seedlings dusted with

carborundum and inoculated by means of a sponge with sap from tobacco plants infected with cucumber mosaic virus were stripped of the lower epidermis by cellophane tape at intervals after inoculation. Infected and normal samples analysed with a Perkin Elmer model 21 infra-red spectrophotometer for wavelengths 1–15 μ showed a range of cellular reactions to infection, the significance of which is discussed.

KUHN (C. W.) & BANCROFT (J. B.). **Specific infectivity changes with Alfalfa mosaic virus.**—Abs. in *Phytopathology*, **50**, 9, p. 643, 1960.

Lucerne mosaic virus in systemically infected tobacco plants and inoculated leaves declined in both conc. and specific infectivity after an initial peak. This decline was more rapid at 90° than at 60° F.

NITZANY (F. E.) & COHEN (S.). **A case of interference between Alfalfa mosaic virus and Cucumber mosaic virus.**—*Virology*, **11**, 4, pp. 771–773, 1960.

At Virus Res. Unit, agric. Res. Sta., Rehovoth, Israel, protection of lucerne mosaic virus, inoculated on $\frac{1}{2}$ leaves of *Chenopodium amaranticolor*, was secured by subsequent infection with cucumber mosaic virus [**39**, 528], the suppression of lesions for inoculation intervals of 3, 6, and 9 days being 63, 79, and 71%, respectively. Similar protection was not detected when *Zinnia elegans* or *Nicotiana glutinosa* were used as local lesion hosts nor when other viruses were used. The results do not exclude the possibility of a relationship between the 2 viruses.

THOMSON (A. D.). **Possible occurrence of interference systems in virus-infected plants.**—*Nature, Lond.*, **187**, 4739, pp. 761–762, 1960.

At agric. Res. Council Virus Res. Unit, Cambridge, viruses not producing local lesions, viz. (1) type str. tobacco mosaic virus (TMV), (2) masked [symptom] str. TMV, (3) AST 4 potato virus X, (4) tobacco veinbanding necrosis virus str. potato virus Y, (5) type str. potato virus Y, or (6) severe [tobacco] etch virus, inhibited the formation of lesions by other strs. which do produce lesions, viz. (1) [tomato] aucuba str. TMV, (2) rib grass str. TMV, (3) 3 XE-1 str. potato virus X, (4) type str. potato virus Y, and (5) cabbage black ring spot virus, respectively, if simultaneously inoculated to susceptible leaves. The lesions from combined inoculation were notably fewer and smaller than those from single strs. It is believed that sap from infected plants contains an inhibitory factor [cf. above], apart from infective particles.

KASSANIS (B.) & NIXON (H. L.). **Activation of one plant virus by another.**—*Nature, Lond.*, **187**, 4738, pp. 713–714, 1960.

At Rothamsted exp. Sta., Harpenden, large and small particles in the Rothamsted tobacco necrosis virus were serologically unrelated. Whereas the large particles could multiply by themselves, the small ones could apparently do so only in the presence of the large. The studies described indicate that small particles interfered with and, if abundant, suppressed the multiplication of the large particles.

YARWOOD (C. E.). **Topical susceptibility to viruses.**—Abs. in *Phytopathology*, **50**, 9, p. 659, 1960.

Stem inoculation of bean [*Phaseolus vulgaris*] and cowpea with peach yellow bud mosaic virus [**39**, 560] caused earlier systemic infection and greater injury than did inoculation of the leaves, hypocotyls, or roots. The use of K_2HPO_4 increased infection only on the leaves. The roots were more readily invaded than the tops when hypocotyls were inoculated. When tobacco roots were inoculated with tobacco mosaic virus the virus remained in the roots for several weeks and the conc. there was lower than when the roots became infected after inoculation of the

leaves. Topical susceptibility has been demonstrated in several other host-virus combinations.

MARTIN (C.). **Étude de quelques déviations de métabolisme chez les plantes atteintes de maladies à virus.** [A study of some metabolism abnormalities in plants affected by virus diseases.] —*Thès. Fac. Sci. Univ. Paris*, Ser. A, 3156, 73 pp., 1 col. pl., 7 fig., 15 graphs, 1959. [95 ref.]

After an historical review and a description of the methods used, the author presents a full account of his studies on oxidation phenomena in plants affected by virus diseases, the activities of the enzymes responsible for abnormal forms of oxidation, and the accumulation of phenolic compounds in diseased plants. The fluorescent bodies present in affected plants are identified, the anthocyanin pigments are studied in healthy and diseased potato sprouts, and the paper concludes with a section on the utilization of the irregularities of pigmentation in the sprouts for the diagnosis of potato virus diseases [**37**, 550].

BERCKS (R.). **Serologische Untersuchungen zur Differenzierung von Isolaten des Phaseolus-Virus 2 und ihrer Verwandtschaft mit Phaseolus-Virus 1.** [Serological studies on the differentiation of isolates of Bean yellow mosaic virus and its relationship to Bean common mosaic virus.]—*Phytopath. Z.*, **39**, 2, pp. 120–128, 2 fig., 1960. [Engl. summ.]

At Inst. für Virusserologie, Brunswick, differences between 4 isolates of bean yellow mosaic virus (YM) [**36**, 809]—L 778 from white bitter lupins, EV 500 from peas, WK from Wundklee (*Anthyllis vulneraria*), and an American isolate—were often detectable to a certain extent from a comparison of the homologous and heterologous titres. The 2 strs. that were most strongly differentiated gave only $\frac{1}{62}$ or $\frac{1}{75}$ of the homologous titres in cross reactions. All 4 isolates could be differentiated on the basis of absorption tests. Infection experiments and a comparison of the expression of the symptoms also permitted a partial distinction between the isolates. Cross reactions between common mosaic [**37**, 749] and YM confirmed the relationship between them. The reactions of the serum of the former indicated a relatively close relationship, whereas the reactions of the latter and absorption tests showed relatively slight relationships.

GARGA (R. P.). **Studies on virus diseases of plants in Madhya Pradesh. III. The yellow-net disease of Eclipta prostrata Linn.** *Curr. Sci.*, **29**, 8, pp. 324–326, 2 fig., 1960.

A description of the symptoms and graft transmission of this disease, which appears to be confined to this host.

HEINZE (K.). **Versuche zur Übertragung nichtpersistenter und persistenter Viren durch Blattläuse.** [Experiments on the transmission of non-persistent and persistent viruses by aphids.]—*NachrBl. dtsch. PflSchDienst, Stuttgart*, **12**, 8, pp. 119–121, 1960.

At Inst. für gärtnerische Virusforschung, Berlin-Dahlem, attempts were made to transmit 12 viruses by 25 aphid spp. Results are tabulated. Some failures to transmit were due to the use of unsuitable experimental plants.

SOL (H. H.), VAN HEUVEN (J. C.), & SEINHORST (J. W.). **Transmission of rattle virus and Atropa belladonna mosaic virus by nematodes.**—*Tijdschr. PlZiekt.*, **66**, 3, pp. 228–231, 1960. [Dutch summ.]

The sources of nematodes used at Inst. voor Plantenziektenkundig Onderzoek, Wageningen, were sandy soils infested with rattle [str. of potato stem mottle]

virus or *A. belladonna* mosaic virus [**39**, 221]. Virus infection did not occur in tobacco plants transplanted to nematode-free soils, but in soil previously freed from nematodes or from both nematodes and viruses, in uninfested natural soil, or in sterilized potting compost all with added nematodes from infested soils the plants often became heavily infected. It is concluded that the nematodes were vectors of both viruses.

Later experiments (by Sol & Seinhorst) indicated that *Trichodorus pachydermus* can transmit rattle virus.

Lister (R. M.). **Soil-borne virus diseases.**—*Sci. Hort.*, **14**, pp. 90–96, 2 pl., 1960. [21 ref.]

The results of recent researches in Scotland and elsewhere into the transmission of plant viruses through the soil are reviewed and discussed, with special reference to investigations at Scottish hort. Res. Inst., Invergowrie, into the ring spot viruses [cf. **38**, 19, 330; **40**, 143 and below].

Cadman (C. H.) & Harrison (B. D.). **Studies on the behaviour in soils of Tomato black ring, Raspberry ringspot, and Arabis mosaic viruses.**—*Virology*, **10**. 1. pp. 1–20, 1960.

When turnip, sugar beet, and spinach seedlings were grown at Rothamsted exp. Sta. for various periods in soils containing tomato black ring (TBRV) and raspberry ringspot [raspberry Scottish leaf curl] viruses [cf. below], and then transplanted to virus-free soil, some of them became infected in 3 days, and many in 9. The ease with which TBRV infected and multiplied in roots decreased as the age of the seedlings increased: the presence of the virus in soils could be demonstrated by growing certain seedlings in them, but not by inoculating leaves of test plants with soil extracts. Infection of these seedlings was confirmed by abrasion inoculation of *Chenopodium amaranticolor* [**38**, 268] with root sap. In highly infective soils 1 seedling became infected/100–200 g. soil. Soil infectivity was decreased by freezing at −10° C. Pentachloronitrobenzene, thiram, ethylene dibromide [**39**, 428], and nemagon were effective soil disinfectants. The infectivity of soils containing TBRV was associated with particles which sedimented through 7 cm. water in 30 sec.–5 min.

Seedlings grown in non-infective field soil or autoclaved soil in pots did not become infected when watered with highly infective sap. TBRV became established in autoclaved sand when watered with crude eelworm preparations from infective soils, but not when the sand was mixed with washed roots of naturally infected plants. It also became established in non-infective field soil planted with artificially infected sugar beet: the receptivity of this soil, apparently specific for the beet ringspot str. of tomato black ring virus, was abolished by autoclaving.

The data given are thought to indicate that a soil-inhabiting agent, possibly on eelworm, is concerned in the transmission of TBRV.

Cadman (C. H.). **Studies on the relationship between soil-borne viruses of the ringspot type occurring in Britain and continental Europe.**—*Virology*, **11**, 4, pp. 653–664, 1960.

Plant protection and/or serological tests [cf. **40**, 143] at Scottish hort. Res. Inst., Invergowrie, indicated that cherry trees infected by diseases of the rasp leaf type in England, Germany, and Switzerland contained either arabis mosaic [loc. cit.] or raspberry ringspot [raspberry Scottish leaf curl] viruses, but a virus from cherry with Eckelrader disease in the Netherlands was not related to either of these. No antigens common to raspberry Scottish leaf curl and tomato black ring viruses were detected [cf. **40**, 57], though the 2 often occur together in fields.

HARRISON (B. D.) & NIXON (H. L.). **Purification and electron microscopy of three soil-borne plant viruses.**—*Virology*, **12**, 1, pp. 104–117, 13 fig., 1960.

At Rothamsted exp. Sta., Harpenden, highly infective, purified preparations of tomato black ring, raspberry ringspot [raspberry Scottish leaf curl], and arabis mosaic viruses [cf. above] were obtained by macerating infected *Petunia hybrida* or tobacco leaves in a butanol-chloroform mixture, followed by clarification, differential centrifugation, and rate zonal centrifugation in sucrose density gradients. Particle shape, mode of transmission, properties *in vitro*, and behaviour in plants suggest that these viruses should be placed in the same group in any classification.

Annual Report of the Colonial Pesticides Research Unit, Arusha, Tanganyika, East Africa, for 1959–1960. (Progress Report No. 26.) –26 pp., 3 pl., 1 graph, 1 map, 1960. 6*s*.

In the sect. [cf. **39**, 213] on fungicides (pp. 14–16) it is stated that the technique for assessing effectiveness against *Phytophthora palmivora* [cf. **40**, 32] on cacao pods has been further refined, the zoospore suspension used for infection being standardized at 200,000 ml., which produces a more constant number of lesions. In comparative tests with 3 cuprous oxides (50% Cu), 3 Cu oxychlorides (50% Cu), 4 mixed fungicides, and a standard laboratory Bordeaux mixture, the Cu oxychloride formulations were consistently inferior to the oxides, 2 of which were inferior to Bordeaux, in protecting against *P. palmivora*, while of the mixed formulations only 1, containing a mercurial in addition to 50% Cu oxychloride, appeared to offer any advantage.

In a field trial 4 fungicides under comparison, 2 containing 50% Cu as cuprous oxide and 2 standard fungicides (a 50% Cu as cuprous oxide and a carbide-Bordeaux mixture), did not differ significantly in the protection they afforded. There was a direct correlation of black pod incidence on total pods harvested, which demonstrated the need to allow for this correlation in comparative fungicide trials.

HOLLIDAY (P.). **A spraying and harvesting trial in Trinidad against Cocoa pod diseases.**—*Trop. Agriculture, Trin.*, **37**, 3, pp. 235–242, 1960.

In a spraying trial against *Marasmius perniciosus* [**34**, 775] and *Phytophthora palmivora* in 1954–5 on the Non Pareil estate in a high rainfall area of E. Trinidad (±130 in./yr.) where black pod incidence was expected to be high, blitox (at a Cu equivalent of 1% Bordeaux mixture) was applied with low-pressure, hand-pumped sprayers at 10–30 gal./acre in the cropping region of the tree only, according to the size and number of pods, to determine whether pod losses could be reduced further after witches' brooms had been removed. Nearly 28% black pod infection of the main crop in the unsprayed plots was recorded. Spraying reduced black pod by 48–67% in pods over 10 cm. long, incidence falling to 9·3% with increased frequency of spraying (up to 12 times at 2-weekly intervals). On the unsprayed plots black pod on those harvested weekly was reduced by up to 41% over those harvested every 4 weeks, but witches' broom was significantly higher in these plots. Spraying increased the general healthy pod harvest by up to 48% and weekly harvesting by up to 22%. Crop loss as beans/pod was 90% with witches' broom infection and 60% with black pod in the unsprayed, harvested 4-weekly. Dry cacao/acre was increased by 22% (128 lb.) in the sprayed plots and 31% (180) by frequent harvesting.

Minor fungal diseases (mostly *Botryodiplodia theobromae*) were reduced both by spraying and by frequent harvesting. Previous experience had also shown that the 1 month interval adopted in Trinidad for recording pod yields where disease % was required was too long.

Results suggested that general Cu spraying would be beneficial, probably giving yield increases up to 25% in the wetter areas, and if better control of witches' broom could be achieved by spraying, fungicides would probably increase yields more than improvements and modifications in husbandry.

Slykhuis (J. T.). **Evidence of soil-borne mosaic of Wheat in Ontario.**—*Canad. Plant Dis. Surv.*, **40**, 1, p. 43, 1960.

A mosaic first observed on winter wheat in June 1957 was found to be widespread in a survey of S.W. Ont. in May–June, 1960 [map 84]. Symptoms developed on test plants grown in soil from an affected field, but attempts at sap transmission failed.

Dixon (G. E.). **A review of Wheat breeding in Kenya.**—*Euphytica*, **9**, 2, pp. 209-221, 1 diag., 1960. [Dutch summ.]

This historical account from the Plant Breeding Sta., Njoro, includes a survey of results with Kenya wheats in other countries which confirm the extent of their resistance to rusts (*Puccinia graminis*, *P. recondita*, *P. glumarum* [*P. striiformis*]) viewed internationally, and indicate the value of continuing the breeding on a genetically additive basis. A discussion on longer-term questions covers such subjects as the role of out-of-season crops, the concept of composite vars. with inherent diversity of rust resistance, and, finally, the need for max. genetic breadth throughout all breeding for rust resistance, the long-term aim being higher levels in this respect.

Green (G. J.), Knott (D. R.), Watson (I. A.), & Pugsley (A. T.). **Seedling reactions to stem rust of lines of Marquis Wheat with substituted genes for rust resistance.**—*Canad. J. Pl. Sci.*, **40**, 3, pp. 524–538, 1 pl., 1960. [20 ref.]

The results are presented of further work [**38**, 684] at the Canada Dept Agric. Res. Sta., Winnipeg, Man., at Univ. Sask., and in Australia of the reactions of lines of Marquis wheat carrying singly 7 genes for resistance to 99 N. American cultures (29 races) and 8 Australian cultures of *Puccinia graminis* f. sp. *tritici* [**39**. 403]. Genes Sr 6 (probably = Sr_{ka1}), Sr 8, and Sr 9 (= Sr_{kb1}: possibly there are 2 alleles at this locus) conferred a uniform type of resistance to most of the isolates, while Sr 7 (allelic to a resistance gene in Marquis) and Sr 10 gave only moderate resistance to a few and became less effective after 5 back crosses. The lines with Sr 6, Sr 8, and Sr 9 react almost identically to the Chinese Spring lines, Red Egyptian XX, VI, and XIII, respectively [**36**, 522], and probably these vars. carry these genes. The resistance of lines carrying Sr 7, Sr 8, and Sr 9 is little affected by high temp. but that of Sr 10 and especially Sr 6 is diminished. Comparison was made between the behaviour of these isogenic lines and Flor's isogenic lines of flax [**35**, 892; **39**, 394].

Rowell (J. B.), Loegering (W. Q.), & Powers (H. R.). **Mutation for pathogenicity in Puccinia graminis var. tritici.**—Abs. in *Phytopathology*, **50**, 9, p. 653, 1960.

A culture of *P. graminis* (111 × 36#5) heterozygous at 4 loci for pathogenicity, with avirulence dominant, and with a tentative genotype $P_1p_1P_2p_2P_3p_3P_4p_4$, was irradiated with 121 kr. of 100 Kvp X-radiation. P_1p_1 with the corresponding gene R_1R_1 in the host [cf. **38**, 251] gives 0 infection type, P_2p_2 with R_2R_2 a 2–3c, P_3p_3 with R_3R_3 a 2, and P_4p_4 with R_4R_4 a 0. The gene pair R_1R_1 occurs in the wheat vars. Marquis, Hope XVII, Reliance, and Kota, R_2R_2 in Marquis and Reliance, R_3R_3 in Reliance, and R_4R_4 in Kota. When the irradiated spores were screened on Marquis, 136 cultures gave 2–3c infection type reactions, indicating that P_1p_1 had mutated to p_1p_1 and permitted the expression of P_2p_2. Selection of

these mutants permitted the expression of the 3 other genes affecting virulence on Marquis, Reliance, and Kota.

Popov (V. I.). Об учете стеблевой ржавчины Пшеницы. [Assessment of stem rust of Wheat.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 9, pp. 44–45, 1960.

In the Amur area, U.S.S.R., rust [*Puccinia graminis*] infection on the stem between the ear and the 1st node on var. Lutescens 062 assessed by Melcher's and Parker's scale [cf. **2**, 112] was 12·5% in plants from Apr.-sown, 25% in those from May-sown, and 48% in those from June-sown seed, compared with 25, 38, and 68%, respectively, between the ear and the 1st leaf. Both counts showed the concentration of infection in the upper part of the stem.

Miladinović (N.) & Spasić (M.). **Suzbijane Puccinia graminis tritici sulfanilamidom.** [Control of *P.g.* f. sp. *tritici* with sulphanilamide.]—*Arh. poljopr. Nauk.*, **13**, 40, pp. 107–113, 1960. [Engl. summ.]

At Inst. Agric., Belgrade, and Agric. exp. Sta., Zaječar, Yugoslavia, control of the E. and S.E. Serbian races and biotypes of the rust on wheat vars. Rumunska crvenka, Bankut 1205, San Pastore, and Autonomija was most effective when treatment with 1% sulphanilamide [cf. **37**, 639] took place on the 5th day after inoculation (0·1–1·2% infection compared with 2·9·1 when treatment was 2 days before inoculation and with 23·5–25·6 in the controls). Results varied somewhat with the vars. Though in field experiments the results were less pronounced, the av. grain wt. was increased by 6·4–15·5% and the number of grains/ear by 9·3–14%.

Hassebrauk (K.). **Untersuchungen über die physiologische Spezialisierung des Weizenbraunrostes (Puccinia recondita Rob. = P. triticina Erikss.) in Deutschland und einigen anderen europäischen Staaten im Jahre 1958.** [Investigations of the physiological specialization of Wheat brown rust (*P. recondita*) in Germany and some other European States in 1958.] –*NachrBl. dtsch. PflSch-Dienst, Stuttgart*, **12**, 7, pp. 106–107, 1960.

Races 1, 12, 17, 20, 52, 53, 77, 93, 155, and 165 were identified in 1958 from a total of 258 samples, mostly from Germany, examined at the Inst. für Botanik, Brunswick [cf. **38**, 505]. A number of these were associated with the sub-race G1, distinguished on var. Sizilianischer Binkel. The most frequent races were 17 and 52 [cf. **40**, 97].

Naumova (Мме N. A.). О вредоносности желтой ржавчины, заражающей семена Пшеницы. [On infectiousness of yellow rust contaminating Wheat seed.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 9, pp. 21–22, 1 fig., 1960.

Abundant spores of *Puccinia glumarum* [*P. striiformis*] on the glumes and grains were noticed in areas where leaf infection invariably occurs in susceptible vars., e.g. in some parts of Kirgiz S.S.R. At Pushkin Base All-Union Inst. Plant Prot. plants of wheatgrass-wheat hybrid 599 from grain with teleutospores on the glumes were delayed in development and bore grain healthy in appearance, but of lower weight. These in turn produced plants considerably retarded in development. As spores on the grain are not always apparent, samples should be stored on filter paper in moist chambers for 2 or more days and then inspected for pustules before sowing.

Enikeev (M.). Протравливание семян яровой Пшеницы от пыльной головни. [Treatment of summer Wheat seed against loose smut.]—Сел. Хоз. Сибири [*Sel. Khoz. Sibiri*], **5**, 7, pp. 29–30, 1960.

As a result of field tests at the Omsk agric. Inst., Siberian sci. Res. Inst. Agric.,

and élite farms, using Mil'turum 553 and Caesium 111 wheat, the most effective methods of disinfecting seed against loose smut [*Ustilago nuda*: **40**, 99] have proved to be the 1-phase (2 hr. at 47°) and 2-phase heat treatments with the addition of 1 g./kg. granosan after drying. Rhodane was effective only with the comparatively susceptible Mil'turum 553. In 1958-9 with Caesium 111, the best results were obtained with anaerobic treatment for 70 hr. at 21°, infection being 0·002% in both years.

Purdy (L. H.). **Wheat bunt development in relation to postinfection environment.** —Abs. in *Phytopathology*, **50**, 9, p. 651, 1960.

Seedlings of the susceptible Ulka and Red Bobs vars. from seed inoculated with *Tilletia caries* averaged 99·3% infection, which was unaffected by deficient and excess amounts N, K, P, and Ca, or by variations in soil moisture.

Sewell (W. D.) & Caldwell (R. M.). **Use of benzimidazole and excised Wheat seedling leaves in testing resistance to Septoria tritici.**—Abs. in *Phytopathology*, **50**, 9, p. 654, 1960.

The best results, correlating well with those under field conditions, were obtained when the leaves were placed with the cut ends in 40 p.p.m. benzimidazole and sprayed with a conidial suspension of *S. tritici* [**38**, 199] in 0·5% gelatin, and kept at 70° F. and a day-length of 12 hr. High resistance was maintained by Lerma 50 and Nabob; P14–3H–15H–2H and Kanqueen were moderately resistant and Dual, Knox, and Vermilion susceptible.

Nakagawa (M.). **Studies on the resistance of Wheat vars. to Gibberella saubinetti regarding their genetical characters and environmental factors.**—*Bull. 1st Agron. Div., Tokai-Kinki agric. Exp. Sta.* 7, pp. 1–31, 13 diag., 3 graphs, 1960. [Jap. Abs. from Engl. summ.]

In this further contribution [cf. **37**, 470] the percentage of wheat kernels infected by *G. saubinettii* [*G. zeae*: **39**, 406] was calculated for each var. and the results tabulated for each year since 1953. Estimates of var. resistance were reliable only in seasons of severe infection, which were affected by the rainfall during Dec.–Jan. and the min. temp. during growth. Resistant vars. had a higher ratio of stem wt. to total wt. and a lower water content in the glume 6 days after flowering than had susceptible vars. Infected kernels in susceptible vars. tended to be aggregated on the spike. Eight amino acids were translocated from the stem to both healthy and infected kernels but 3 sugars were translocated to healthy only. Susceptible vars. contained more sugars than resistant ones. It is concluded that the susceptibility of wheat to *G. zeae* depends on both environmental factors and heredity. The final percentage of infected kernels was unaffected by climate after the heading stage. Susceptibility was increased when vars. were grown in areas with climatic conditions unsuited to them.

Valdeyron (G.) & Seguela (J.-M.). **Étude bibliographique et expérimentale sur le mitadinage.** [A bibliographical and experimental study of mealiness.]—*Ann. Amélior. Plantes*, **3**, pp. 291–328, 2 pl., 2 diag., 2 graphs, 1958. [Engl., Germ., Russ. summ. 31 ref. Received Sept. 1960.]

Wheat 'mealiness' ('yellow berry', or 'starchiness') [cf. **34**, 144] has been reported to be due to N deficiency. Culturing in nutrient solutions demonstrated that the condition could be induced by cutting off N during the week after ear formation.

Shalavin (A. I.). Предохранение озимых от склеротинии. [Protection of winter cereals from *Sclerotinia*.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 9, pp. 23–24, 1960.

At Falenskaya Selection Sta., U.S.S.R., application to the soil of high-pressure

steam and 20–30 tons ha. manure+P and K fertilizers, dusting 3–6 times with granosan at 6 kg./ha. before and at the beginning of snowfall, and N dressing in spring notably reduced the incidence of *S.* spp. [**36**, 394] in numerous wheat and rye vars. The same treatment also controlled snow mould [*Calonectria nivalis*]. Granosan enhanced the viability of the wheat and yields increased from 310 to 740 kg./ha.

Schaller (C. W.). **A survey of the world Barley collection for resistance to Barley yellow dwarf.** —Abs. in *Phytopathology*, **50**, 9, p. 653, 1960.

A total of 6,728 barley vars. were inoculated with yellow dwarf virus by means of viruliferous aphids [cf. below]. Using dwarfing as the most reliable criterion of infection, 28 vars. were rated highly resistant, 34 resistant, and 55 fairly tolerant. Of the vars. in the 1st 2 classes (all suitable as breeding material), 60 are introductions from Abyssinia, while the other 2 are hybrids with Abyssinian types in their parentage.

Mueller (W. C.), Rochow (W. F.), & Ross (A. F.). **Transmission of Barley yellow dwarf virus to Oats by aphids made viruliferous by needle injection.**—Abs. in *Phytopathology*, **50**, 9, p. 647, 1960.

In further tests [**39**, 301], the EGV str. of barley yellow dwarf virus was transmitted by *Macrosiphum granarum* [*M. avenae*] and AGV by *Rhopalosiphum fitchii* [**39**, 567]. No transmission occurred when EGV was injected into *R. fitchii* or AGV into *M. avenae*. The latter, injected with crude haemolymph, transmitted EGV to 16 of the 18 oat plants infested, with clarified haemolymph to 8 of 12, with crude sap from infected oats to 8 of 20, with clarified sap to all 24, and with partially purified EGV to all 10. *R. fitchii* after injection with crude haemolymph transmitted AGV to all 12 plants infested, and with crude oat sap to 10 of 20 plants.

Noverová (Ilse). **O metodách zjišťování rezistence vůči chorobám obilovin.** [On methods for the determination of resistance of cereals to diseases.]—*Ann. Acad. tchécosl. Agric.*, **33**, 3, pp. 377–390, 5 fig., 1960. [Russ., Germ., Engl. summ. 35 ref.]

Of about 1,000 barley and 5,500 wheat vars. and selections at Halle-Wittenberg Univ., Germany, those highly resistant in field observation nurseries were further assayed *in vitro* and *in vivo* by inoculation methods, comprehensively described, largely similar to those in use elsewhere. Mention may be made of the partial vacuum spraying of barley flowers with *Helminthosporium gramineum* spore suspension and the spraying of *Puccinia glumarum* [*P. striiformis*] spore suspensions to barley seedling plots at a number of foci for general infection of the surrounding plants.

Loiselle (R.) & Shands (R. G.). **Influence of maternal tissue on loose smut infection of hybrid Barley kernels.**—*Canad. J. Bot.*, **38**, 5, pp. 741–746, 4 pl. (24 fig.), 1960. [18 ref.]

Histological examinations of inoculated barley kernels of the resistant Anoidium and Trebi and the susceptible Odessa and their reciprocal F_1 hybrids were made in a joint study by Univ. Wis., Madison, and Canada Dept Agric., Ottawa. In resistant kernels mycelium of *Ustilago nuda* [cf. **40**, 41] was present in the chalazal region and the parenchyma associated with the vascular bundle, but in the susceptible var. it was found in the crease region, integument, aleurone, endosperm, and embryo. Mycelial development in F_1 hybrids was similar to that of the female parent, but the maternal influence was secondary to that of the genotype of the embryo.

Moseman (J. G.). **Genes conditioning pathogenicity in Erysiphe graminis f. sp. hordei on Barley variety Atlas 46. Inheritance of 5 genes conditioning pathogenicity in Erysiphe graminis f. sp. hordei on Barley.**—Abs. in *Phytopathology*, **50**, 9, p. 647, 1960.

Two genes, inherited independently, were concerned in the pathogenicity of cultures CR3 and CAN 12 of *E. g.* f. sp. *hordei* [**39**, 165] on Atlas 46; 1 also conditioned pathogenicity on Atlas and the other on Goldfoil and Stephan.

In further studies of progeny from crosses of the cultures CR3, CAN 12, 59–11, and 59–20 one gene governed pathogenicity to each of the vars. Kwan, Goldfoil, Nepal, Peruvian, and Chevron, the 1st 3 being inherited independently and the other 2 closely linked with 4 nonparental type cultures. Several physiologic races not identified previously in N. America [**39**, 301] were isolated from the progeny cultures.

Vacke (J.). **Symptomatologie virové sterilnosti a zakrslosti Ovsa.** [Symptomatology of virus sterility and stunting of Oats.] —*Ann. Acad. tchécosl. Agric.*, **33**, 8, pp. 1049–1066, 13 fig., 2 graphs, 1960. [Russ., Germ., Engl. summ.]

This comprehensive report from Res. Inst. Plant Production, Ruzyně, Czechoslovakia, enlarges upon information already noticed [**39**, 166]. Following the incubation period infected oat leaves turned deep green, whereafter the youngest of them developed light green, then dirty yellow, and finally brown diffuse dots, spots, and stripes at the base. There was no discoloration in other hosts, except the initial greening in wheat. The stalks of infected oats, wheat, and barley were shorter, thicker, more succulent and more brittle than those of healthy plants. Symptoms on oats were much more severe than on wheat and barley, while on rye no destructive changes took place. In general the development of the symptoms decreased with the age of the host plants at the time of infection.

Theis (T.), Murphy (H. C.), Simons (M. D.), Calpouzos (L.), McVey (D.), & Porter (F. M.). **Oat varieties with adult plant field resistance to race 264 of crown rust.**—Abs. in *Phytopathology*, **50**, 9, p. 657, 1960.

A high degree of adult resistance to race 264 of oat crown rust [*Puccinia coronata*: **40**, 101] was exhibited by the hexaploid lines S.E.S. Sel-52 from Africa, D.L. 41372 (Argentina), and K.H.C. (France) under heavy inoculation in 2 nurseries in Puerto Rico. Some of the progeny from crosses between these lines and susceptible vars. retained the parental resistance.

Luke (H. H.) & Pfahler (P. L.). **Inheritance and linkage studies of a derived Victoria-type crown rust resistance and Victoria blight.**—Abs. in *Phytopathology*, **50**, 9, p. 644, 1960.

This study indicated that resistance to blight [*Cochliobolus victoriae*: cf. below] in a mutant of Fulgrain oats [**39**, 568] was inherited as a simple recessive character and that reaction to race 205 of crown rust [*Puccinia coronata*: **39**, 407] was also simply inherited, the mutant being dominant or partially dominant. A degree of crossing between the 2 loci was apparent.

Nelson (R. R.). **Cochliobolus victoriae, the perfect state of Helminthosporium victoriae.**—*Phytopathology*, **50**, 10, pp. 774–775, 1960.

Mature perithecia were obtained at N. Carol. State Coll., Raleigh, by pairing conidial isolates of appropriate wild type strs. of *C. victoriae* from oats on opposite sides of a piece of autoclaved maize leaf on Sach's nutrient agar [cf. **40**, 30] and also on sterile barley grains. The perithecia are black, 225–430 μ in height $\times$ 210–370 μ diam., usually with an ostiolate beak 30–170 μ long. The asci measure

98–207 × 20·4–38·7 (mean 137·5 × 26·8) μ and the ascospores, arranged helically, are hyaline, 5–9 septate, and 147–302 × 6·5–13 (226·5 × 8·1) μ.

Buchenau (G. W.). **Etiology and epiphytology of Victoria blight of Oats.**—*Diss. Abstr.*, **20**, 12, pp. 4483–4484, 1960.

At Iowa State Univ. Sci. Technol. the roles of primary and secondary inocula in the development of epiphytotics, and factors affecting these inocula of *Helminthosporium* [*Cochliobolus*] *victoriae* [**39**, 568] were studied. As has been reported for *H. sativum* [*C. sativus*] the soil microflora has an adverse effect on soil-borne inoculum [**38**, 509] of *C. victoriae*, but in autoclaved soil a decrease in inoculum potential was not observed until 2 weeks had elapsed. In field trials the inoculum potential of *C. victoriae* decreased in untreated soil but not in formaldehyde-treated until after recolonization had taken place. The other source of primary inoculum, seed-borne infection, was controlled by ceresan M [**38**, 512] and water-soak treatments.

C. victoriae spread rapidly in soil containing roots of susceptible oat vars. but not in non-sterile soil in the absence of roots. Seed treatment fungicides and soil amendments of decomposed manure did not control secondary spread, which was however reduced by planting mixed stands of resistant and susceptible vars.

Holton (C. S.) & Dietz (S. M.). **An apparent association of haploid lethal factors with two unique sorus types of Oat smut.**—*Phytopathology*, **50**, 10, pp. 749–751, 2 fig., 1960.

At U.S. Dept Agric., Pullman, Wash., a lethal factor inhibiting budding was displayed by 92% of the sporidia isolated from a biotype of *Ustilago avenae* producing black, indurate sori on the inflorescence, sheath, and leaf, and by 50% of those from a buff, indurate sorus mutant of *U. kolleri* [*U. hordei*: **20**, 458].

Holton (C. S.) & Halisky (P. M.). **Dominance of avirulence and monogenic control of virulence in race hybrids of Ustilago avenae.**—*Phytopathology*, **50**, 10, pp. 766–770, 1960.

Avirulence to oats was dominant in 9 hybrids involving 7 races of *U. avenae* [**36**, 395] in studies at Pullman, Wash. Virulence was inherited in monogenic F_2 ratios of 3 A to 1 V. Segregation and recombination in hybrids with multiple genes for virulence gave rise to new races.

Clark (R. V.) & Zillinsky (F. J.). **Varietal reaction of Oats to the Septoria disease under field and greenhouse conditions.**—*Canad. Plant Dis. Surv.*, **40**, 1, pp. 1–9, 3 fig., 1960.

Some oat vars. moderately tolerant of *Leptosphaeria avenaria* f. sp. *avenaria* [**39**, 696] in the field were susceptible when heavily inoculated in the greenhouse at the Genetics and Plant Breeding Res. Inst., Ottawa. Some strains of wild *Avena* spp., particularly diploid ones (*A. brevis*, *A. nudibrevis*, *A. strigosa*, *A. wiestii*), were more resistant. In preliminary greenhouse tests ascospores gave better results as inoculum than macrospores, which caused too severe infections.

Rubtsova (Mme I. D.). Развитие микоризы у сорговых. [Development of mycorrhiza in *Sorghum* spp.]—*Agrobiology, Moscow, 1960*, 5 (125), pp. 759–761, 1960.

Endotrophic mycorrhiza were detected at Voronezh State Pedagogical Inst. in most sorghum vars., particularly Ranniĭ yantar' and Chernyĭ yantar', and in Sudan grass, particularly Voronezhskaya 1. They developed intermittently, being present in some 40% of sorghum plants at sprouting, vanishing entirely at tillering, reappearing at ear formation, and reaching max. development at flowering, after

which they declined gradually until harvest. Of 2 fungi found in the roots, 1 had scantily septate hyphae, 3·8–5 μ diam., usually interwoven inside the 3 cell layers of the surface parenchyma, whereas the other, with brown hyphae 1–2 μ diam., was parasitic. The absence of the latter from the cells with mycorrhizal hyphae suggested antagonism of the former. Soil dressing with P and NPK fertilizers, but not N alone, stimulated mycorrhizal development and increased yields considerably.

Crossa-Raynaud (P.). **Les principales maladies des Agrumes dans le Bassin Méditerranéen : gommose et maladies à virus.** [The principal Citrus diseases in the Mediterranean Basin: gummosis and virus diseases.]—12 pp., reprinted from *Tunis agric.*, November, 1959.

A review [cf. **39**, 577], with special reference to Tunisia, with notes on the selection of resistant vars. and on the control of Zn deficiency.

Peiris (J. W. L.) & Bertus (A. L.). **The tristeza disease of Citrus in Ceylon.**—*J. agric. Soc. Trin. Tob.*, **60**, 2, pp. 204–218, 1960. [16 ref.]

In grafting experiments at Wellassa (Bibile), begun in Nov. 1955, scions from declining sweet orange when budded to healthy stocks gave grafts that soon declined, indicating the presence of a virulent str. of citrus tristeza virus [map 289]. The disease was also transmitted by the black citrus aphid (*Toxoptera citricidus*), which is present in Ceylon.

McClean (A. P. D.). **Seedling-yellows in South African Citrus trees.**—*S. Afr. J. agric. Sci.*, **3**, 2, pp. 259–279, 6 pl., 1960. [Fr., Afrikaans summ.]

It has yet to be established whether the virus components which cause tristeza in sweet orange indicators on sour orange stocks and seedling-yellows [**35**, 587; **36**, 99; **40**, 168] in indicator plants of sour orange and lemon are citrus tristeza virus strs. [**37**, 41] or are 2 or more distinct viruses. In this paper from Div. Plant Path., Pretoria, the viruses are referred to as tristeza or seedling-yellows according to the symptoms produced in appropriate indicators; a 3rd set of symptoms produced in W. I. lime seedlings are distinguished as the lime reaction.

In S. Africa the virus complexes divide into 3 groups according to the type of citrus in which the complex normally occurs and the disease induced, viz: (1) viruses occurring naturally in sweet oranges, tangerines, and rough lemons, which produce tristeza, seedling yellows, and a (usually) severe lime reaction; (2) viruses from clonal lemons (Eureka and Lisbon) which produce neither tristeza nor seedling-yellows; the lime reaction may be either severe or mild, and infected sour orange seedlings have occasional wood pits and flecks on the veins of new leaves; and (3) viruses from clonal grapefruit which show more variation in the symptoms produced in indicators and which are intermediate between the other 2 groups. In countries where the disease is transmitted by *Aphis gossypii* and *A. spiraecola* in the absence of *Toxoptera citricidus* the tristeza virus seems to be simpler than the above complexes.

Seedling-yellows virus has been found in all the sweet orange trees tested in S. Africa and all mature seedling rough lemons. The general absence of this virus from grapefruit, lemon, and sour orange suggests that some kind of field resistance is operative in these spp. Evidence has been obtained that the seedling-yellows virus does not persist in grapefruit as it does in sweet orange and rough lemon. Details are given of the rare natural occurrence of seedling-yellows in grapefruit, lemon, and sour oranges, and of instances of apparent changes in the virus complex in sour orange seedlings over a period of years, and of persistence in the stock even though no longer apparent in grapefruit scions.

It is suggested that measures to control aphids should be taken in nurseries by

spraying rootstocks, particularly those to be used for grapefruit and lemon, to prevent the stocks from acquiring seedling-yellows.

WEATHERS (L. G.). **Yellow-vein disease of Citrus and studies of interactions between yellow vein and other viruses of Citrus.**—*Virology*, **11**, 4, pp. 753–764, 4 fig., 1960.

Some of this information from Dept Plant Path., Univ. Calif., Riverside, has been noticed [**37**, 234; **38**, 4; **39**, 309] in a summarized form. All available evidence indicates that citrus yellow vein virus does not spread from citrus to citrus under natural conditions. The virus was transmitted by several tissue-grafting methods, but not by *Cuscuta subinclusa* or by mechanical inoculation.

TSAO (P. H.) & VAN GUNDY (S. D.). **Effect of soil temperature on pathogenesis of Thielaviopsis basicola on Sweet Orange roots.**—Abs. in *Phytopathology*, **50**, 9, p. 657, 1960.

In further work [**39**, 411] in Calif. growth of sweet orange seedlings in controlled soil-temperature tanks was reduced 89–95% by *T. basicola* [cf. **39**, 462] at 15–20° C, 83–85% at 25°, and 34–36% at 30° (the opt. for seedlings in uninoculated soils). It is concluded that the fungus is most likely to affect growth in late autumn–early spring.

KIELY (T. B.) & LONG (J. K.). **Market diseases of Citrus.**—*Agric. Gaz. N.S.W.*, **71**, 3, pp. 132–135, 157, 3 fig.; 4, pp. 187–192, 6 fig., 1960.

A description of the symptoms of the principal diseases of citrus fruits in N.S.W. with control measures.

MONTENEGRO (H. W. S.) & SALIBE (A. A.). **Conservação de sementes de porta-enxertos para Citrus.** [The storage of Citrus stock seed.]—*Rev. Agric. Piracicaba*, **35**, 2, pp. 109–136, 22 graphs, 1960.

At the Escola Superior de Agricultura 'Luiz de Queiroz', Univ. São Paulo, Piracicaba, Brazil, seeds of 9 different citrus stocks with a high moisture content and kept in plastic bags were heavily attacked by [unspecified] fungi. Percentage germination was higher in seed treated with phygon XL-DDT. Seeds of *Poncirus trifoliata* and bitter orange were least susceptible. It appears that the critical limits of moisture content, below which germination is heavily reduced, are *P. trifoliata* 25–27%, the remainder 10%.

BOCK (K. R.). **Interim recommendations for the control of Coffee leaf rust.**—*Kenya Coffee*, **25**, 297, pp. 372–373, 375, 3 graphs, 1960.

The results of studies on the seasonal epidemic cycles of coffee rust [*Hemileia vastatrix*: cf. **40**, 169] in Kenya (where seasonal increase in infection depends on the rainfall pattern), the dispersal of the rust in the field, and on the timing of sprays [**39**, 412] are presented and discussed and interim recommendations for control based on them are made for climatically varying parts of the area. Epidemic build-up results from spore dispersal by water, and effective control measures must be applied before spore distribution occurs. Ill-timed or inadequate sprays greatly increase the severity of the next epidemic.

STOLP (H.). **Über das Zusammenwirken von Bakterien und Insekten bei der Entstehung einer Geschmacksbeeinträchtigung des Kivu-Kaffees und die Rolle von Bakteriophagen bei der Aufklärung der Zusammenhänge.** [On the combined action of bacteria and insects in the origin of the taste of Kivu Coffee and the use of bacteriophages in attempts to clarify this phenomenon.]—*Phytopath. Z.*, **39**, 1, pp. 1–15, 1960. [Engl. summ.]

Investigations at Inst. für Bakteriologie, Biol. Bundesanstalt für Land- und

Forstwirtschaft, Berlin-Dahlem, of Arabica coffee produced in Kivu, E. Congo, which sometimes has an unpleasant flavour, indicated that the change to a defective flavour occurs on the tree. It is due to *Xanthomonas* type bacteria which develop in the fruit flesh enveloping the beans, producing a characteristic metabolic substance which impregnates the beans with 'potato taste' and makes them unusable. The substance causing the typical smell and flavour develops also on artificial nutrient media.

Infection of the berries by the bacteria occurs when the eggs of fruit flies (*Trirhithrum inscripta* and *Ceratitis annonae*), common locally, are laid. Certain individuals (av. < 1/1,000) are infected cyclically with the bacteria. The beans in an infected berry are not damaged externally by larval activity or by the reproduction of the bacteria. In a plantation where the incidence of infestation and infection was very high contamination was controlled by destroying the fruit flies.

Subba-Rao (N. S.). **Etiology of wilt in Fusarium-infected Cotton.**—*Phytopathology*, **50**, 10, pp. 763–765, 1 fig., 1960.

At Univ. Bot. Lab., Madras, India, cotton plants infected by *F.* [*oxysporum* f.] *vasinfectum* [**39**, 312] fluoresced under UV light; 5 days after germination of seeds in infested soil fluorescence was observed in the root endodermis, spreading progressively into medullary rays, phloem, and xylem. Leaves and petioles fluoresced even when the pathogen was present only in the roots and stem. Fusaric acid detected 2 days after germination reached a max. on the 13th day. Other *F.* spp. produced no fluorescence in cotton, and 6 other crop plants grown in soil infested with *F.o.* f. *vasinfectum* failed to fluoresce or yield the fungus.

Lagière (R.) & Cognée (M.). **Les traitements fongicides et bactéricides des semences du Cotonnier en République Centrafricaine.** [Fungicidal and bactericidal treatments of Cotton seed in the Central African Republic.]—*Cot. et Fibr. trop.*, **15**, 1, pp. 41–67, 1960. [Engl. summ. 21 ref.]

This is a continuation of a previous report from Bambari Exp. Sta. [**33**, 674], the whole representing a bibliographical study up to 1939 and showing the results of tests for the control of seedling pathogens, including besides those already enumerated *Pythium aphanidermatum*, *P. mamillatum*, *Vermicularia* sp., and *Botryodiplodia theobromae*. Of more than 20 chemicals used in various forms, granopera (aagrano) is recommended as a dust, agrosan 5 W for slurry, and panogen for 'pseudo-wet' treatment.

Logan (C.). **An estimate of the effect of seed treatments in reducing Cotton crop losses caused by Xanthomonas malvacearum (E. F. Smith) Dowson, in Uganda.**—*Emp. Cott. Gr. Rev.*, **37**, 4, pp. 241–255, 2 graphs, 1960. [16 ref.]

A full account is given of 3 experiments in 1959-60 at the Cotton Res. Sta., Namulonge, Uganda, to (1) determine the efficiency of 4 Hg seed treatment chemicals in comparison with perecot 45 (cuprous oxide) in reducing the loss of yield caused by bacterial blight (*X. malvacearum*) [**39**, 414], (2) compare the efficiency of 3 new and 3 standard seed dressings in controlling primary infection, and (3) estimate the effect of stem lesions upon the yield of individual plants.

Though agrosan 5 W was much more effective than perecot 45 in reducing primary infection, the final yields of plots treated with the 2 dressings were similar. Only the stem phase of the disease appreciably reduced yield. There was a closer linear relationship between yield/plot and disease index than between yield and per cent stem lesions/plot. Stem lesions in plots of untreated seed reduced yield by about 20%, in those with agrosan treated seed by 8%, and perecot by 12%.

Stem lesions caused loss of early crop, though the plants partially compensated

for this by producing more later-formed bolls than did plants without stem lesions. The inter-relationships of bacterial blight, water stress, and insect injury in causing loss of early crop are discussed. A disease index merely indicates the severity of blight in an area and season, it does not provide an estimate of crop loss.

Green (L.). **A note on Cotton seed dressing in Uganda.**—*Emp. Cott. Gr. Rev.*, **37**, 4, pp. 256–257, 2 pl., 1960.

In the treatment of cotton seed by Dept Agric. against *Xanthomonas malvacearum* [cf. above] a large form of the Booth revolving drum mixer [cf. **39**, 229] is used, suitably housed, with a concrete platform above, to which the seed is delivered from the ginnery by a pneumatic contrivance which is briefly described. So far, 10,000 tons have been treated without a stoppage.

Safarov (S.) & Babaev (F.). Эффективность нового способа обработки семян Хлопчатника для борьбы с гоммозом. [The effectiveness of a new method of treating Cotton seed for the control of gummosis.]—Соц. сел. Хоз. Азерб. [*Sots. sel. Khoz. Azerb.*], **7**, 3, pp. 44–47, 1958.

Following an assessment of the incidence of gummosis [*Xanthomonas malvacearum*: **39**, 312] on cotton in various regions of Azerbaijan in 1957, the recommendations of the Dept Phytopathol., Azerbaijan Cotton sci. Res. Inst. [**39**, 312], are supplemented by an injunction to give the seed a preliminary mechanical delinting and sorting (sorting machine OS-I) before treating heavy and large seed fractions with 20% Cu trichlorophenolate, which also protects against [unspecified] root rot [**37**, 401]. Yield was increased by 2·2–7·1 centners/ha.

Schnathorst (W. C.) & Halisky (P. M.). **Severity, prevalence, and ecology of Cotton boll rots as related to temperature.**—Abs. in *Phytopathology*, **50**, 9, pp. 653–654, 1960.

Cotton boll rot is caused predominantly by *Aspergillus flavus* [cf. **37**, 662] and *A. niger* (opt. growth temp. 33° C.) in the warmer States and in S. Calif., where the av. summer temp. is 32°, and by *Nigrospora oryzae* (opt. 24°) in central Calif. [**39**, 106] which is about 6° cooler in summer. *Fusarium moniliforme* [*Gibberella fujikuroi*] and *Rhizopus nigricans* [*R. stolonifer*] are of minor importance in both areas. Differences in severity and distribution of boll rot fungi are attributable to their temp. requirements.

Oaks (Ann) & Shaw (M.). **An indoleacetic acid 'oxidase' system in the mycelium of Melampsora lini (Pers.) Lév.**—*Canad. J. Bot.*, **38**, 5, pp. 761–767, 1 graph, 1960. [26 ref.]

A typical peroxidase-mediated indoleacetic acid 'oxidase' was secreted by *M. lini* mycelium grown on flax cotyledons from seedlings in modified Knop's medium [cf. **37**, 355] at the Univ. Sask., Saskatoon. Its chemical behaviour was studied and the results as related to host-parasite interactions and activity *in vivo* are discussed.

Kiss (E.). **Adatok Len-fajtagyüjtemény feldolgozásához.** [Data for the preparation of a collection of Flax varieties. I.]—*Mag. Tud. Akad. Agrár. Oszt. Közl.*, **14**, 1–3, pp. 85–96, 2 fig., 1958.

Results of tests of 247 vars. and lines in 1953–56, including disease resistance [**39**, 582].

Covegno della Società italiana di Fitoiatria, San Remo, 10–11–12 giugno 1960. [Conference of the Italian Society for Plant Protection, San Remo, 10–12

June 1960.]—*Notiz. Malatt. Piante, 1960*, 53–54 (N.S. 32–33), 360 pp., 31 pl. (1 col.), 23 graphs, 1960.

The opening paper of this conference on the control of diseases and parasites of flowering plants and ornamentals, by R. Ciferri [Phytopathological aspects of flower culture] (pp. 9–14) referred *inter alia* to some of the newer fungicides and virus diseases. The other papers, with refs. and mostly with Engl. summ., include the following. N. Cuscianna [Phytosanitary problems in the cultivation of flowers and ornamentals on the Riviera dei Fiori] (pp. 15–29) covered the chief diseases observed by the author locally during the past 30 yr. E. Mameli Calvino [The control of diseases of flowering plants yesterday and today] (pp. 31–47) compared present control methods with those of 35 yr. ago. E. Andreucci [Diseases and plant parasites of flowers in the vicinity of Pescia] (pp. 49–75) described physiological, virus, and fungus diseases of carnations [**39**, 472], gladioli, and other flowers. M. Ambrosi [Preliminary experiments on the control of Rose powdery mildew] (pp. 77–80) dealt with *Oidium leucoconium* var. *rosae* [*Sphaerotheca pannosa*]. A. Vedani [Application of fertilizers to the leaves of plants in the prevention and cure of deficiency diseases] (pp. 85–91). J. C. Scurti [The control of fungus diseases of bulbs] (pp. 103–120). P. de Sarjas [Vapam in flower cultivation] (pp. 121–130). J. C. Scurti & M[aria] M. Rangone Gallucci [On a mosaic of Primula] (pp. 131–138) described a condition thought to be due to primula mosaic virus [**21**, 201]. U. Terrosi [Researches on the biological activity of maneb] (pp. 139–146). E. Baldacci & M. Sganzerla [Technical and agronomical aids to the control of *Botrytis* and *Fusarium* on Gladioli] (pp. 147–154) discussed date of planting, soil factors, irrigation, harvesting, and the drying and storage of the corms in relation to the control of *B. gladiolorum* and *F. oxysporum* f. *gladioli*. R. Ciferri, A. Corte, & F. Corbetta [Some viroses and the presumed bacterioses of Orchidaeae at Pavia] (pp. 175–187) described a number of diseases affecting cultivated orchids at the Bot. Gardens, Pavia, and in local commercial plantings, some of which were attributed 50 yr. ago to bacteria, but which are now found to be due to viruses [cf. **39**, 25 *et passim*]. M. L. B. Biga [A virosis causing leaf reticulation of Caper] (pp. 189–191) described a condition affecting *Capparis spinosa* and transmitted by budding. G. Bestagno gave 5 papers: [A probable virosis causing leaf reticulation of *Sarcococca ruscifolia* (Buxaceae)] (pp. 193–194); [The influence of the physical state of the soil and of sterilizing treatments upon Carnation 'wilts'] (pp. 195–213) dealing with the control by soil treatments of the diseases associated with *F. roseum*, *Rhizoctonia* [*Corticium*] *solani*, *F. oxysporum* f. *dianthi*, and *Verticillium cinerescens* [cf. **39**, 472]; [A probable virosis of *Anthurium andreanum*] (pp. 215–216); [Injury to Carnations caused by chromium present in a mixed fertilizer] (pp. 217–226); [Report of 'yellow mosaic' of Rose] (pp. 227–231) [cf. **14**, 363; **19**, 409], a condition thought to be probably due to a virus complex. O. Lovisolo [Report of a new virosis of *Moricandia arvensis* and observations on other viroses of ornamentals] (pp. 233–253) found a leaf mosaic and slight flower variegation of *M. arvensis* to be due to cabbage black ring spot virus, which frequently causes leaf mosaic and flower breaking of *Matthiola incana* in N and central Italy; a severe mosaic of petunia caused by tomato bushy stunt virus (str.) [**36**, 590]; the petunia mosaic caused by cucumber mosaic virus [**17**, 600]; a vein mosaic of petunia induced by potato virus Y [cf. **39**, 713]; a mosaic of *Ranunculus asiaticus* apparently caused by *Ranunculus* mosaic virus [Smith: **36**, 303]; mosaic of various hosts, caused by cucumber mosaic virus; and various diseases of ornamentals, probably of virus origin. A Graniti [Experiments on the control of downy mildew of the Vine in Apulia with zineb sprays] (pp. 255–267). A. Graniti & C. Laviola [Comparative tests with certain fungicides on the control of Vine downy mildew [*Plasmopara viticola*] in spring and autumn in Apulia] (pp. 269–284). F. Corbetta & A. Corte ['Yellow mosaic' and 'infectious chlorosis' of the Rose] (pp. 285–291)

[see above]; the latter disease [rose mosaic virus] is a new record for Italy. An appendix by P. Alghisi & M. L. Da Re ['Collar rot' of Chicory in the market-gardens of Chioggia. Etiology and control] (pp. 323–352) described the disease caused by *Sclerotinia minor* [cf. **25**, 537].

Koval' (É. Z.) & Nelen (E. S.). Мучнистая роса Желтой Акации. [A mildew on Yellow Acacia.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 10, pp. 52–53, 1960.

Microsphaera palczewskii is reported from Far E. Branch S.O. Acad. Sci. U.S.S.R. as attacking the ornamental *Caragana arborescens* in the Amur, Khabarovsk, and Primor'e areas. After its 1st appearance early in July the dirty-grey mildew spread quickly and covered 75–95% of the leaf surface within about 10 days. Spraying with 0·2% phygon reduced infection from 95 to 2% and dusting with S to 5%. Without further treatment infection re-developed during the summer to reach its normal proportion within approx. 1 month 6 weeks according to the fungicide previously used. Prophylactic treatment with S dust (3 applications) delayed the appearance of the mildew and confined its spread to 45% of the leaf surface during the following 20 days, whereas phygon and 1% S suspension had only a slightly retarding effect. The shrubs should therefore be dusted with S at 50 g./plant not less than 4 times at fortnightly intervals from mid-June.

Natour (R. M.) & Miller (H. N.). **Stem rot of Dracaena sanderiana.**—Abs. in *Phytopathology*, **50**, 9, p. 648, 1960.

Heavy losses in nursery plantings of *D. sanderiana* in Fla are caused by an apparently new var. of *Aspergillus niger* which the authors propose to name var. *floridanus* [nom. nud.]. Infection occurs through the base of tip cuttings before and during rooting; infected plants wilt, the leaves turning yellow progressively upwards and the lower part of the stem becoming blackened and water-soaked. The fungus can survive for long periods in the soil and attacked only *Dracaena*. It produced pectic enzymes, causing maceration of the host tissue well in advance of invasion.

Bergann (F.) & Bergann (L.). **Über die sogenannte Kräuselkrankheit der Poinsettia und die Beteiligung des 'Dermatogens' bei der Mesophyllbildung.** [On the so-called crinkle disease of Poinsettia and the part played by the dermatogen in the formation of the mesophyll.]—*Flora, Jena*, **149**, 3, pp. 331–344, 11 fig., 1960.

Studies at Bot. Inst. der Pädagogischen Hochschule, Potsdam-Sanssouci, Germany, revealed that this abnormality in *Euphorbia pulcherrima* is caused by a vegetative mutation giving rise to irregular activity of the dermatogen, which results in the typical ragged edges of the leaves.

Protsenko (E. P.) & Chelyshkina (Mme B. A.). Об устойчивости сортов Гладиолуса против фузариозного усыхания. [On the resistance of Gladiolus vars. to *Fusarium* wilt.]—Бюлл. глав. бот. Сада, Москва [*Byull. glav. bot. Sada, Moskva*], *1960*, 37, pp. 92–96, 1960.

At the bot. Garden, Moscow, gladiolus corms and ratoons reported to be resistant to *F.* yellowing were planted in soil infested with cultures of *F. oxysporum* f. *gladioli* [cf. **37**, 665] isolated from an infected corm. In the field none of the 42 vars. tested was immune, but their susceptibility varied greatly [cf. **38**, 521], the most resistant being Lucette, Sonatine, Gold Dust, De Goede's Triumph, Hopman's Glory, Mansoer, and Early Orange. However, a different scale of varietal resistance was obtained for the harvested corms, and there were also differences in 1 var. between plants grown from corms and from ratoons.

PROTSENKO (E. P.) & CHEL'YSHKINA (MME B. A.). Желтение Гладиолусов в связи с поражением их **Sclerotinia gladioli (Mass.) Dray.** [Yellowing of Gladioli in connexion with their infection by *S. gladioli*.]—Бюлл. глав. бот. Сада, Москва [*Byull. glav. bot. Sada, Moskva*], *1960*, 36, pp. 95–98, 1 fig., 1960.

At the bot. Garden, Moscow, gladiolus corms were planted in hothouse soil infested with *S. gladioli* but treated before planting with 3 g. granosan/kg., 70 cu. cm. 1% formalin/kg., or by heat. All the heat treated (8) were healthy, while some of those treated with granosan and formalin and all the controls were infected.

SCHENK (P. K.). **Hardrot van Gladiolen, veroorzaakt door Septoria gladioli.** [Hard rot of Gladioli, caused by *S. gladioli*.]—*Tijdschr. PlZiekt.*, **66**, 3, pp. 205–227, 4 pl., 1 diag., 3 graphs, 1960. [Engl. summ.]

This disease, studied at Laboratorium voor Bloembollenonderzoek, Lisse, has long been one of the principal obstacles to the culture of gladioli on heavy soil in the Netherlands [cf. **39**, 72].

On plants grown from cormlets primary infections appear as pycnidia above soil level in late May and early June. The spread of secondary infection depends on rain and wind, protection by hedges or other crops, and the ratio of the susceptible one-leaved cormlet plants to the less susceptible ones having more than one leaf; it is reduced by severe leaf spot (*Botrytis gladiolorum*). Primary infection on large plants from corms differs from that on cormlet plants in appearing later (late July in very susceptible cultivars) and in the absence of pycnidia. Secondary leaf spots are seldom found.

The direct importance of infested soil is not great, but it may be a threat when cormlets are planted, as a few primary infections may occur and form sources for secondary attack.

Preplanting disinfection of diseased corms [cf. **24**, 103] with organic Hg (aamersil, aaglitan, and aafertis) gave very good results against primary infection, and on cormlets practically 100% control was obtained by a hot water treatment at 53 or 55° C. for ½ hr. The spread of secondary infection was prevented in one experiment by spraying with 0·4% aazimag (containing 35% zineb—30% maneb).

NELSON (R.). **A basal leaf and stem spotting of Gladiolus.**—Abs. in *Phytopathology*, **50**, 9, p. 648, 1960.

The vars. June Bells, Valeria, Hopman Glory, and Sans Souci are severely affected in Mich. and the 1st 3 on several Fla farms by a spotting of the corm, fleshy leaf bases, and flowering stem. Two spp. of bacteria were isolated; the primary pathogen had cultural characters distinct from those of the associated *Phytomonas* [*Pseudomonas*] *marginata* and caused typical symptoms when inoculated alone by spraying the leaves or dipping the corms in a culture suspension.

KAZMAIER (H. E.). **Some pathophysiological aspects of premature defoliation associated with Rose blackspot.**—*Diss. Abstr.*, **21**, 1, p. 21, 1960.

Filtrates of 8 of 24 isolates of *Diplocarpon rosae* [cf. **39**, 318] from diseased rose leaves at 2 locations in Ohio degraded indole-3-acetic acid (IAA) in liquid culture to varying degrees (40–99%) at Ohio State Univ. IAA and some substances acting as auxin precursors were extracted from 250 mg. samples of healthy leaflets, but not from comparable diseased leaflets, leading the author to conclude that they are destroyed in the leaf by some activity of the fungus. The amount of IAA which may be extracted from a given quantity of healthy leaflet tissue diminishes rapidly in autumn; it was therefore not possible to determine how far auxin destruction determined premature leaf fall.

BOEREMA (G. H.). **De oorzaak van 'zwartbenigheid' bij Tulpen.** [The cause of 'black leg' in Tulips.]—*Tijdschr. PlZiekt.*, **66**, 3, pp. 232–234, 1960. [Engl. summ.]

A description from the Plantenziektenkundige Dienst, Wageningen, of this disease,

recently observed in the Netherlands (*Weekbl. BloembCult.*, **70**, p. 20, 1959). At the end of the growth period the base of the flower stalk contracts and turns dark grey to black. The leaves are usually discoloured violet, and the external brown outer scales of the new bulbs are, superficially, dark grey, especially at the base where the old flower stalk was connected. A sunken, black lesion may occur on the basal plate of the new bulb and sometimes also on the outermost fleshy bulb scale.

Diseased bulbs are one source of infection, but contaminated soil may infect healthy bulbs. The disease has also been observed on iris and crocus.

The causative agent, a sclerotium-producing fungus with mycelium at first hyaline and then brownish black, produces microconidia on phialides in old cultures, suggesting a *Sclerotinia* sp., though no apothecia have yet been observed. It is provisionally proposed to refer it to *Sclerotium* sp. The disease may be identical with the black rot in the U.S.A. suggested by Gould [**37**, 44] to be caused by *Sclerotinia sclerotiorum*. This fungus is certainly not responsible for black leg, but is known in the Netherlands as an agent of a soft slimy rot of tulips [**30**, 56].

Black leg can be controlled by treating the bulbs immediately before planting with quintozene, tecnazene, or an organic Hg compound, and soil may be disinfected with quintozene.

Prota (U.). **Esperienze intorno alla trasmissione di Alternaria zinniae Pape mediante i semi di Zinnia e saggi di disinfezione dei medesimi.** [Experiments on the transmission of *A. zinniae* on *Zinnia* seeds and attempts at seed disinfection.]—*Notiz. Malatt. Piante, 1960*, 52 (N.S. 31), pp. 119–130, 1 pl., 1960. [Engl. summ.]

Of the seed samples (19 var.) examined at Univ. Sassari, Sardinia, all those from 5 localities on the mainland of Italy were infected by *A. zinniae* [cf. **39**, 587], though 2 lots from the Sassari region were healthy. Damping-off due to the fungus [cf. **38**, 9] was controlled by dusting the seed with agrosan GN, which had no injurious effects. Zineb gave moderately good results.

Couch (H. B.) & Bloom (J. R.). **Influence of environment on diseases of turfgrasses. II. Effect of nutrition, pH, and soil moisture on Sclerotinia dollar spot.**—*Phytopathology*, **50**, 10, pp. 761–763, 2 graphs, 1960.

The substance of this further contribution [**40**, 52], dealing with *S. homoeocarpa* on *Poa pratensis*, has been noticed [**39**, 176].

Badoux (S.), Corbaz (R.), Pelet (F.), & Savary (A.). **La 'fatigue' du Trèfle.** [Clover 'exhaustion'.]—*Rev. rom. Agric.*, **16**, 8, pp. 69–73, 6 fig., 1960.

Dying-off of red clover in Switzerland is attributed to virus diseases, fungal attack, especially by *Sclerotinia trifoliorum* [**38**, 411 and below], nematodes, and 'exhaustion' due to non-parasitic causes. The condition can be remedied indirectly by the selection of resistant, long-lasting vars. and improved cultural methods.

Nüesch (B.). **Einige wichtige Resultate aus Beobachtungen an Rotklee-Einzelpflanzen verschiedener Sorten.** [Some important results from observations of individual Red Clover plants of several varieties.]—*Mitt. Schweiz. Landw.*, **8**, 10, pp. 145–155, 5 fig., 1 graph, 1960.

In inoculation tests [cf. **27**, 365] at the Eidg. Landw. Versuchsanst., Zürich, cultivated local and foreign red clover vars. were more resistant to *Sclerotinia trifoliorum* [cf. above; **40**, 112] than wild clovers. Resistance was improved by selection.

Grylls (N. E.) & Peak (J. W.). **Varietal reaction and genetic resistance of Subterranean Clover (Trifolium subterraneum L.) to Subterranean Clover stunt virus infection.**—*Aust. J. agric. Res.*, **2**, 5, pp. 723–733, 1960.

In greenhouse tests at C.S.I.R.O., Canberra, with 390 strs. of subterranean clover

from Europe and Australasia high levels of genetic resistance to the virus [**38**, 700] were found in the Australian vars. Tallarook, Hill's Small, and Bass B. Resistance of selected F_2's was midway between that of the parents. In selected F_4 hybrids and some 2nd and 3rd backcrosses resistance equal to Tallarook was found. Some plants which appeared to recover in the tests exhibited a temporary tolerance of virus infection. Though 3 aphids (*Aphis craccivora*) fed for 3 days gave a high percentage of transmission, 5 gave a more critical idea of relative resistance.

Graham (J. H.) & Zeiders (K. E.). **Pathogenicity and morphology of some leguminicolous and related species of Stemphylium.**—*Phytopathology*, **50**, 10, pp. 757–760, 12 fig., 1960.

In inoculation studies with 7 spp. and 4 unidentified isolates of *Stemphylium* at the U.S. Regional Pasture Res. Lab., Univ. Park, Pa, *S. botryosum* [*Pleospora herbarum*: **36**, 593; **38**, 11] had the widest host range, isolates from lucerne and red clover infecting 5 of the 7 test plants, including *Coronilla varia* [**37**, 298], not previously recorded as a host. *S. sarciniforme* infected red clover, Ladino white clover, lucerne, and white sweet clover (*Melilotus alba*); *S. loti* attacked *Lotus corniculatus* and blue lupin; and *S. trifolii* was more pathogenic to Ladino white clover than to red clover and lucerne. *S. solani* and *S. floridanum* from tomato infected only tomato, whereas *S. solani* from blue lupin attacked blue lupin severely and tomato slightly. An *S.* isolate from *Coronilla varia* [loc. cit.] was morphologically similar to *S. solani* but another, small-spored isolate from the same host and 2 from Ladino white clover appeared to be new. Isolates of *P. herbarum* and *S. solani* from various hosts showed differences in pathogenicity which may be due to pathogenic specialization.

Halpin (J. D.) & Osorio (G. R.). **Enfermedades de la Alfalfa.** [Diseases of Alfalfa.] —*Agric. Tec. Méx.*, **5**, 4–5, pp. 42–43, 1958. [*Biol. Abstr.*, **35**, 15, p. 3720, 1960.]

A report on the principal diseases of lucerne in Mexico [cf. **37**, 548], with symptoms, losses, geographical distribution, and recommended control measures.

Morvan (G.). **Développement actuel de l'étude des viroses des arbres fruitiers en France.** [The present state of the study of viroses of fruit trees in France.] — ex *Rapp. Congr. pomol., Florence-Ferrare, 1958*, pp. 88–95, [? 1960].

After a brief discussion of the meaning of virus disease or 'virosis' and the difficulties of diagnosis and control the author gives a succinct account of the virus diseases of stone fruit, pear, and apple in France [cf. **38**, 12, *et passim*]. The paper concludes with a note on the general organization of control methods.

Moore (M. H.). **Apple rootstocks susceptible to scab, mildew and canker for use in glasshouse and field experiments.**—*Plant Path.*, **9**, 3, pp. 84–87, 1 fig., 1960.

From information gained in studies at East Malling [**39**, 651] the author lists selected apple rootstocks according to their observed susceptibility to *Venturia inaequalis*, *Podosphaera leucotricha*, and *Nectria galligena* in the field and to *V. inaequalis* and *P. leucotricha* in the glasshouse, and comments on their use in experiments.

Soenen (A.). & Aerts (R.). **Enregistrement de la période d'humectation du feuillage du Pommier.** [Registration of the wetting period of Apple foliage.]— *Agricultura, Louvain*, Sér. 2, **8**, 3, pp. 421–434, 1960. [Flem., Engl. summ.]

A tabulated survey is given of experiments in 1959 with 'dew-scales' (W. Lambrecht, Göttingen, Germany) [cf. **34**, 56] for the determination of the duration on apple leaves of the wetting period requisite for infection by scab [*Venturia inaequalis*: **40**, 54]. Used with due care the apparatus gave sufficiently accurate indications

for forecasting [cf. **35**, 302]. Regional differences were inconsiderable under conditions of widespread rain but important when there were showers. Since the microclimate is the principal factor in the rapidity of drying of the leaves, the equipment should be situated in the most exposed area of the orchard.

Borecki (Z.), Mrozowska (Mme T.), Borecka (Mme H.), & Suski (Z.). **Z badań nad skutecznością niektórych środków grzybobójczych przy zwalczaniu parcha Jabłoniowego (Venturia inaequalis (Cooke) Aderh.).** [Studies on the efficacy of some fungicides in control of Apple scab (*V. inaequalis*).]—*Prace Inst. Sadow. Skierniewice*, **4** (*1959*), pp. 235–245, 1 fig., 1 graph, 1960. [Russ., Engl. summ.]

At Res. Inst. Pomology, Nowa Wieś, Poland, Cu-containing fungicides gave better results than S-containing. A 1% kupferkalk [copper-lime] Urania was best and the Polish 'bordosol' gave good control. Other Polish Cu-containing chemicals were effective, but damaged the leaves.

Isaeva (Mme E. V.). Эффективность применения новых фунгицидов в борьбе с паршой Яблони и Груши. [The effectiveness of the use of new fungicides for the control of Apple and Pear scab.] –Сборн. науч. Работ Укр. н.-и. Инст. Садовод. [*Sborn. nauch. Rabot Ukr. n.-i. Inst. Sadovod.*], *1959*, 34, pp. 483–492, 1959. [Abs. in *Referat. Zh. Biol.*, *1960*, 17, p. 184, 1960.]

Highly effective for the control of scab of apple [*Venturia inaequalis*: **39**, 422] and pear [*V. pirina*: **36**, 377] was 15% dinitrorhodanbenzene, though inferior to Bordeaux mixture in leaf adherence. Phygon (0·5%) was highly effective against *V. inaequalis* and apple powdery mildew [*Podosphaera leucotricha*]. Lime-sulphur was fairly effective against *V. inaequalis* and *V. pirina*, and 1·5% fuclasin against *V. inaequalis*. A new form of colloidal S (on kaolin) was much inferior to Bordeaux against scab in the forest steppe of the Ukraine, but was highly effective against a number of other fungus diseases of fruit crops.

Ross (R. G.) & Lockhart (C. L.). **Influence of orchard fungicides on Gloeosporium album rot and storage scab of Apples.** –*Canad. Pl. Dis. Surv.*, **40**, 1, pp. 10–14, 1960.

In further experiments at Res. Sta., Canada Agric., Kentville, Nova Scotia [**37**, 541], good control of *G. album* [*Pezicula alba*] storage rot of McIntosh and Cortland apples was given by a spray schedule of captan 50W (2 lb./100 gal.) pre-cover, then 3 regular and 2 late cover sprays of captan (1½ lb.) or captan+parzate (1+1 lb.). Dyrene (2 lb.) was effective without the late cover sprays. Storage scab (*Venturia inaequalis*) was controlled by captan in the pre-cover and parzate (2 lb.) or captan+parzate in the regular and late cover. Cyprex (¾ lb.) gave excellent results without the late cover sprays.

Wartenberg (H.). **Studien am Apfelmehltau Podosphaera leucotricha (Ell. et Ev.) Salm. mit Berücksichtigung einer normergisch-plasmatischen Abwehrreaktion.** [Studies on Apple mildew (*P. leucotricha*) with respect to a normergic-plasmatic defence reaction.] –*Phytopath. Z.*, **39**, 1, pp. 16–64, 14 fig., 1960. [Engl. summ. 137 ref.]

Observations and assay of attack by *P. leucotricha* [**38**, 754] on *Malus* spp. and vars. under natural conditions at the Inst. der allgemeinen Botanik, Friedrich-Schiller-Univ., Jena, Germany, enabled the susceptibility but not the resistance of the hosts to be determined. Primary infections occur somewhat at random, in such a way that plasmatically susceptible types may remain uninfected. This random attack may be governed by the possibilities of bud infections, which are limited in time. Of many apple vars., hybrids, and wild *Malus* spp. tested in the

field in 1953–4, 442 were susceptible and 240 of these bore perithecia; 4 seedlings of cultivated vars. which developed no infection were the true Glockenapfel, Gefleckter Anis, Wargul, and Rotex Ziegler. In addition 43 wild forms were uninfected.

The course of infection on susceptible plants is described on the basis of infected sepals. The infection chain is closed from year to year by primary infection so the chance of a bud infection is decisive in determining variations in intensity, extent, and fluctuations of attack. A secondary role is played, more rarely, by the normal plasmatic defence reaction resulting in an interruption of the infection chain.

Inoculation of *M. halliana*, *M. toringo*, and *M. coronaria* was negative on the leaves but a few fructifications formed on the sepals. Microscopic examination of the latter revealed that the plasmatic defence reaction 'disorganizes' the fungus. Not all the haustoria were destroyed by host reaction. A few survived and developed mycelium to the point of producing conidiophores. In a test on 150 sepals a few conidiophores were found on 2 only. The 'disorganized' haustoria were mostly found in unchanged host cells. Some of the cells containing destroyed haustoria had clumped, deeply staining granulations or plasma which indicated the beginning of a necrosis of the host cell.

Bigot (C.). **Observations sur Gloeosporium fructigenum Berk. et sur deux parasites, responsables de pourritures de Pommes en cours de conservation.** [Observations on *Glomerella cingulata* and on two parasites causing rots of stored Apples.]—*Ann. Épiphyt.*, **11**, 2, pp. 183–200, 23 fig., 1960.

A full account is given of studies at École nationale d'Agriculture, Grignon, France, on a rot of stored apples caused by a str. of *G. cingulata* with setulose acervuli. This character disappeared in culture on synthetic media and was not present in isolates from inoculated fruits. Apples, pears, and quinces were susceptible to the str. when maintained in a damp chamber at 18–20° C. On agar media a hyphal form, pseudopycnidia, and typical acervuli developed.

Studies are also described on 2 other fungi causing rot of apples, *Sphaeropsis malorum* Peck (*Physalospora cydoniae*) [*P. obtusa*: **13**, 313] and *Phoma umbilicaris*.

Martin (D.), Lewis (T. L.), & Cerny (J.). **Bitter pit in the Apple variety Cleopatra in Tasmania in relation to calcium and magnesium.**—*Aust. J. agric. Res.*, **2**, 5, pp. 742–749, 1960. [34 ref.]

At the Tasmanian Regional Lab., Hobart, sprays of Mg nitrate increased the incidence of bitter pit [cf. **39**, 476] on Cleopatra apples while Ca nitrate decreased it. In 1959 Ca nitrate increased the Ca content of treated fruit but Mg nitrate had no effect. In 1958 the Ca content was 3·3 times that in 1959, while bitter pit incidence was low in 1958 and high in 1959. The hypothesis that Ca and Mg content are related to the incidence of bitter pit is supported by these results.

Brown (A. G.). **Scab resistance in progenies of varieties of the cultivated Pear.**—*Euphytica*, **9**, 2, pp. 247–253, 1960. [Dutch summ.]

At John Innes Inst., Bayfordbury, Hertford, several selections from progenies of crosses between pear vars. were found to be free from *Venturia pirina* [**36**, 652] in 1 locality but susceptible in another, suggesting that biotypes of the fungus are sharply restricted in their distribution at any given time. Thus vars. are often considered to be resistant when they have merely escaped the biotypes to which they are susceptible.

Resistance is shown to be inherited quantitatively and pear vars. vary in the resistance contribution which they pass on to their progeny. A statistical analysis of the data, using methods applicable to an incomplete diallel cross, has enabled

the contribution of each of 10 parent vars. to the scab resistance of the progenies to be calculated. Moderately resistant selections of good fruit quality should not be difficult to obtain if the parents are carefully chosen. Unfortunately both Durondeau and Fertility, the 2 best parents for scab resistance, are not particularly suitable for breeding lines with high fruit quality. In the present series of tests Doyenné du Comice and Williams' Bon Chrétien offer 1 of the best combinations for fruit quality, but because of the few resistant progeny given by this cross many would have to be grown to obtain worthwhile results.

Ercolani (G. L.) & Caumo (B.). **Il mal bianco del Pero.** [Pear mildew.]—*Progr. agric.*, **6**, 5, pp. 577–583, 3 fig., 1 diag., 1960.

In 1959 symptoms of *Podosphaera leucotricha* [cf. **30**, 327] appeared on pear trees growing in the Adige Valley, Italy, early in May. The vars. most severely affected were Beurré Giffard (70% infected trees), Coscia (25–30%), and Clapp's Favourite (10%).

Weather conditions did not appear to have any direct and immediate effect on infection, though the season was exceptionally cold and wet. Spread was, however, favoured by the high humidity and the turgid condition of the epidermal tissues of the trees. A decisive factor was probably the widespread use locally of non-Cu compounds against pear scab [*Venturia pirina*], which exert no effect upon mildew.

Aliev (G. G.) & Gadzhiev (T. Y.). Сорта Персика, устойчивые против курчавости листьев. [Peach varieties resistant to leaf curl.]—Садоводство [*Sadovodstvo*], **98**, 10, pp. 30–33, 4 fig., 1960.

In a peach orchard of over 100 vars. established in 1948–9 at the Geokchai Sub-Sta., Azerbaijan sci. Res. Inst. for Viticulture, and Sub-Trop. Crops, yield returns in 1955–57 indicated that most of those with low and medium yields were susceptible to leaf curl [*Taphrina deformans*: cf. **38**, 165]. Ag-Kerdi, Kamberlend, Zafrani pozdniĭ, Ag-Nazlȳ, Khidistavskiĭ zheltȳĭ, and Nabatȳ-Nazlȳ were immune; Kȳrmȳzȳ Yarma Geokchaiskiĭ was highly resistant. These vars. are recommended for widespread use in the regions of Azerbaijan. Removal of surplus shoots and added N fertilizer increase resistance.

Morvan (G.) & Castelain (C.). **Le dépérissement de l'Abricotier.** [Apricot wilt.] — ex *Journées fruit. maraîch. d'Avignon, Jan.*, pp. 65–74, 10 fig., 1959.

The results are presented of studies on apricot wilt in S. France [**36**, 37, *et passim*], at Sta. Centrale de Pathologie Végétale, Versailles, and Sta. Expérimentale d'Arboriculture Fruitière, Saint-Genis-Laval. Four forms of wilt are distinguished and their symptoms described, viz. gummosis and canker; incompatibility between graft and stock; verticilliosis (*Verticillium* sp.) [**33**, p. 162]; and 'growth irregularity' [**37**, 292], described by Chabrolin as 'apoplexy' [**5**, 304; **9**, 256; **40**, 117]. Useful notes on control of the four are given.

Németh (Maria) & Kegler (H.). **Untersuchungen über das Vorkommen von Kirschenvirosen in Ungarn.** [Studies on the occurrence of Cherry viroses in Hungary.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **14**, 6, pp. 110–113, 2 pl., 1960. [Russ., Engl. summ.]

A note from Inst. für Phytopathologie, Aschersleben, Germany, based on an inspection of 18 cherry orchards and nurseries in various parts of Hungary. Sour cherry Stecklenberg virus [? peach ring spot str.: cf. **39**, 601] occurred on the vars. Pándy and Cigány, incidence reaching 62% in one orchard; symptoms were narrow leaf, ring spot, and enations. The virus was experimentally transmitted to *Prunus avium*, peach, cucumber, *Chenopodium quinoa*, and *Ammi majus*. Cherry Pfeffinger disease [cherry rasp leaf virus: map 303] occurred on Germersdorfer, Hedelfinger, and Politur Herz, infection ranging from 12 to 92%: young

trees developed leaf deformation and 'oil spots', and the older ones enations and rosettes. The virus was transmitted to *P. avium*, cucumber, and *Datura stramonium*. [Peach] ring spot virus was found on Germersdorfer (up to 80% infection), causing chlorotic rings and bands, and transmitted to *P. avium* and cucumber.

Schuch (K.) & Mischke (W.). **Der Nachweis eines Virusgemisches in einer enationskranken Süßkirsche.** [Demonstration of a virus mixture in a Sweet Cherry with enation symptoms.]—*Z. PflKrankh.*, **67**, 6, pp. 327–332, 3 fig., 1960. [Engl. summ.]

At Inst. für Obstkrankheiten, Heidelberg, Germany, graft inoculation with material from a sweet cherry tree in the Niederspay district with enation symptoms of the type associated with Pfeffinger disease [cherry rasp leaf virus: **39**, 601] gave rise to the characteristic symptoms of this disease on *Prunus avium* seedlings [cf. above] and plants of *P. avium* F 12/1 but was lethal to peach seedlings. The lesions produced in tobacco inoculated with sap from the infected peach were different from those of Pfeffinger disease, and due to a distinct virus, the characteristics of which are described. It was also demonstrated to be present in one infected *P. avium* seedling in addition to the Pfeffinger virus, with which it is considered to be a chance associate.

Wiltosiński (F.). **La lutte contre la maladie du Mûrier blanc (Morus alba) provoquée par le champignon Septogloeum mori (Briosi et Cavara).** [The control of the disease of white Mulberry caused by the fungus *S. mori*.] — *Rev. Ver à Soie*, **11**, 1, pp. 43–50, 5 pl., 1959. [Abs. in *Bull. sign. Cent. nat. Rech. sci.*, **21**, 2, p. 93, 1960.]

In Poland 'false rust' (*S. mori*) [**36**, 600, *et passim*] is the disease most injurious to white mulberry. The paper deals with the taxonomy of the causal organism, symptoms, overwintering, and control.

Stace-Smith (R.). **Current status of Bramble viruses.**—*Canad. Pl. Dis. Survey*, **40**, 1, pp. 24–42, 1960. [51 ref.]

In this paper, presented to a joint meeting of the Canad. and Amer. Entomological Societies, Detroit, Dec. 1959, the spread of *Rubus* viruses is discussed and 10 viruses transmitted by aphids [cf. **39**, 724], 1 by leafhoppers, and 3 by soil are listed, with notes; for a further 13 the vector has yet to be determined. Virus-vector relationships, problems in vector identification, and trends in control are also dealt with.

Lister (R. M.). **Occurrence of soil-borne virus diseases of Strawberry in Britain.**—*Plant Path.*, **9**, 3, pp. 102–105, 1960.

This information has been noticed [cf. **39**, 603; **40**, 214].

Blattný (C.) & Blattný (C.). **A virus green petal disease of Fragaria ananassa.**—*Folia microbiol., Czechoslovakia*, **4**, 5, pp. 345–350, 2 pl., 1959. [Abs. in *Bull. sign. Cent. nat. Rech. sci.*, **21**, 2, p. 87, 1960.]

The symptoms (as observed in Czechoslovakia) are described. Affected plants are not killed, but no fruits form. Only certain vars. are attacked. The virus belongs to the aster yellows groups and appears to be transmitted by *Cicada* spp.

Rhodes (P. L.). **Oil spraying to control Banana leaf spot disease in Fiji.**—*Agric. J. Fiji*, **30**, 1, pp. 29–32, 1 fig., 1960.

A note on the disease (*Mycosphaerella musicola*) [cf. **40**, 59] as it occurs in Fiji and recommendations for control. Regular applications of 1½ gal. oil/acre every 2 weeks from Jan.–July and 1 gal. every 3 weeks for the rest of the year are advised, at an annual cost of approx. £13/acre.

Buddenhagen (I. W.). **Strains of Pseudomonas solanacearum in indigenous hosts in Banana plantations of Costa Rica and their relationship to bacterial wilt of Bananas.**—*Phytopathology*, **50**, 9, pp. 660–664, 6 fig., 1960.

In a survey of abandoned banana plantations in Costa Rica *P. solanacearum* [**38**, 534] was isolated from 9 wilting weed spp. Young banana plants were inoculated with these isolates by pulling down the outermost leaf sheath to expose a clean surface and injecting 1 ml. of bacterial suspension into the pseudostem. Only isolates from *Heliconia* were pathogenic. Thus 2 strs. were distinguished, the 'banana strain', which could wilt tomato and *Physalis angulata* but was not isolated from them in the field, and the 'weed strain'. The degree of pathogenicity of isolates within the banana str. varied considerably; some ('normal') caused rapid wilting, others ('normal bending') also bending or breaking off of the plant, and some ('distortion') malformation and stunting. The banana and weed strs. [cf. **40**, 14] were distinguished by colony appearance on a tetrazolium medium. Susceptibility to a bacteriophage from a banana isolate was not correlated with str. differences.

Zentmyer (G. A.). **Chemotaxis of zoospores for root exudates in relation to infection by Phytophthora cinnamomi.**—Abs. in *Phytopathology*, **50**, 9, p. 660, 1960.

When excised avocado roots 1–2 cm. long were placed in a suspension of *P. cinnamomi* zoospores [**39**, 396] chemotaxy was observed in a few min., with strongest effect in the region of elongation, where a lesion appeared in 24 hr. Killed roots and most living roots of other spp. did not attract zoospores of *P. cinnamomi*, but avocado root extracts on filter paper disks were effective. Zoospores of *P. citrophthora* were attracted by citrus roots but not by avocado.

Zentmyer (G. A.) & Gilpatrick (J. D.). **Soil fungicides for prevention and therapy of Phytophthora root rot of Avocado.**—Abs. in *Phytopathology*, **50**, 9, p. 660, 1960.

Weekly soil drenches of dexon (*p*-dimethylaminobenzenediazo Na sulphonate, 10, 20, and 40 p.p.m.) and SD 4741 (*O, O, O*-trimethyl phosphorothioate, 50, 100, and 200 p.p.m.) gave good control of *P. cinnamomi* on avocado seedlings [see above] in the greenhouse. Growth of treated seedlings was ⁄2–4 that of the controls and root wt. ⁄4–10. Some phytoxicity occurred at the highest dosages.

Orian (G.). **La mélanose de la Mangue.** [Mango melanosis.] –*Rev. agric. sucr. Maurice*, **39**, 3, pp. 128–130, 2 fig., 1960.

Diplodia natalensis is thought to be the agent of a disease causing a rotting of mango fruit [cf. **38**, 535] in Mauritius.

Passion Vine diseases.—*Orchard., N.Z.*, **33**, 8, p. 233, 1960.

Grease spot (*Phytomonas* [*Pseudomonas*] *passiflorae* [**28**, 468]) and brown spot (*Alternaria passiflorae* [**39**, 727]) were well controlled by olecop (40% CuO+25% mineral oil) sprays, which however caused some leaf burn and leaf drop. Maneb and zineb were effective against brown spot, but less so against grease spot. Unlike Bordeaux mixture, a hitherto standard means of control, none of the new chemicals tested left visible deposits on the fruit.

Ablakatova (Mme A. A.) & Koval' (É. Z.). Новый гриб **Phyllosticta actinidiae. (De fungo novo Phyllosticta actinidiae notula.)** [A note on a new fungus *P. actinidiae*.]

Ablakatova (Mme A. A.). Новые виды грибов на **Actinidia. (Species novae fungorum in Actinidiis.)** [New fungus species on *Actinidia*.]—*Bot. Mater.*

(*Notul. syst. sect. crypt. Inst. bot. Acad. Sci. U.S.S.R.*), **13**, pp. 243–244, 1 fig.; 244–246, 2 fig., 1960.

Four new spp. are described: *P. actinidiae* [**40**, 81] on living leaves of *A. arguta* and *A. kolomikta*, *Ramularia actinidiae* on cultivated *A. polygama*, *Macrophoma actinidiae* on dry stems, and *Sphaeropsis actinidiae* on dry boughs of *A. arguta kolomikta*, all in Primor'e, U.S.S.R.

Tenerini (I.) & Loprieno (N.). **Ricerche istologiche sulle zone de insediamento del Cycloconium oleaginum Cast., agente dell' 'occhio di pavone' dell' Olivo.** [Histological studies on the zone of entry of *C. oleaginum*, agent of 'peacock's eye' of the Olive.]—*Phytopath. Z.*, **39**, 2, pp. 101–119, 16 fig., 1960. [Engl., Germ. summ.]

It was demonstrated at Inst. di Ricerche Agrarie, Lab. di Signa, Florence, that on the upper leaf surface and on the fruit the mycelium grows in the lower layer of the cuticle in contact with the outer side of the epidermal cell wall, the pathogen utilizing the cuticle as a food source without destroying the epidermal cell wall. In living leaves *C. oleaginum* [**38**, 415] never passes through the epidermal layer. On the midrib of the lower leaf surface, on the petiole, and on the fruit stem, however, the mycelium develops below the epidermal cells. Infections on the under part of the lamina and on the young twig are rare.

Todorova (Vera). Опити за борба срещу пригора по Лалеманцията. [Experiments in the control of blight on *Lallemantia iberica*.]—Раст. Защ. [*Rast. Zasht.*], **8**, 3, pp. 31–39, 1960. [Russ., Engl. summ.]

Both seed and plant treatment for control of this disease caused by *Alternaria* [*porri* f. sp.] *lallemantiae* [cf. **33**, 561] was assayed by Inst. Plant Prot., Sofia, Bulgaria, in 1954–5. Organic mercurials and H_2SO_4, alone and in various combinations, destroyed infection on the seed surface, but not within, and H_2SO_4 reduced viability. Sprays from early blossom until seed formation (4–5 during a rainy season) with 2% Bordeaux mixture at 200–400 l. dekar were superior to lower concs., or to 1% Ba solution, or dusting with Cu oxychloride and Cu-lime.

Péreau-Leroy (P.). **Le Palmier Dattier au Maroc.** [The Date Palm in Morocco.]—142 pp., 1 col. pl. (3 fig.), 48 fig., 2 graphs, 1 map, Royaume du Maroc, Ministère de l'Agriculture; Institut Français de Recherches Fruitières Outre-Mer, 1958. [Received Oct. 1960.]

Chapt. 4 (pp. 39–87) on diseases [**39**, 486] gives a full account of 'bayoud' (*Fusarium oxysporum* var. *albedinis*) and its control and a brief note on the symptoms and control of 'khamedj' [*Mauginiella scaettae*].

Hinfner (K.) & Csák (Z.). **A Burgonya tő- és levélbetegségei, károsodásai.** [Potato stem and leaf diseases and the damage caused by them.]—173 pp., 44 pl. (42 col.), 1 map, Budapest, Mezőgazdasági Kiadó, 1958. [2 pp. ref. Received Sept. 1960.]

This useful and well-produced quick reference manual contains 41 brief accounts of diseases and pests of potato accompanied by illustrations (pp. 11–96), a general chapt. on protection (pp. 97–125), descriptions of symptoms to enable identification (pp. 127–141), data on varietal reactions (pp. 143–150), a guide to assessing degrees of resistance (pp. 151–160), and a note on the method of classification of potato crops according to quality (pp. 163–165).

Galilov (S.). Микроэлементы — средство борьбы с болезнями Картофеля. [Microelements—a means of control for diseases of Potato.]—Соц. сел. Хоз. Азерб. [*Sots. sel. Khoz. Azerb.*], **7**, 3, p. 50, 1958.

At Kusar Sub-Sta., Inst. Agric., Azerbaijan, individual micro-elements incorporated

in the soil supplemented by a 0·1% spray during growth gave good reduction of potato diseases. Black leg [*Erwinia phytophthora*: **39**, 33, 338] was reduced 50–70%, leaf roll [virus] 46·1–73·1%, and macrosporiosis [*Alternaria solani*: **37**, 304] 40 68%, borax [cf. **39**, 439] and Mn giving the greatest reductions. After spraying with a 0·1 (the more effective) or 0·05% solution of a mixture of all micro-elements *A. solani* was reduced 57·6–75·8%, leaf roll 50–80%, and *E. phytophthora* 27·8–61·9%. Soil applications of B (8 kg. ha.) followed by spraying roots with a 0·1% solution reduced *E. phytophthora* 86·7%, *A. solani* 82·2%, and leaf roll 70·9%. Good results were also obtained with Mn (10 kg. ha.) followed by 0·1% spray.

Young (L. C.), Davies (H. T.), Young (D. A.), & Munro (J.). **Fundy : A new smooth, early-maturing variety of Potato.**—*Amer. Potato J.*, **37**, 8, pp. 274–277, 1960.

Developed at Potato Breeding Sect., Res. Sta., Fredericton, N.B., this var. carries the R 1 gene for resistance to late blight [*Phytophthora infestans*] but is susceptible to potato viruses A, B, X, and Y.

Hoyman (W. G.). **Significance of tuber eye position to the expression of leaf roll virus symptoms by greenhouse-indexed Potatoes.**—Abs. in *Amer. Potato J.*, **37**, 10, p. 348, 1960.

More reliable symptom expression was obtained by growing eyes from the middle or bud-end than the stem-end in tests with 373 tubers of 3 susceptible vars.

Diaz Moreno (J.). **Efectividad de varias sustancias químicas inhibidoras del virus X de las Papas (Annulus dubius Holmes).** [Effectiveness of various chemical substances inhibiting Potato virus X.]—*Turrialba*, **10**, 1, pp. 28–34, 1 diag., 1960.

The substances were tested for their effectiveness as cutting-knife disinfectants [**29**, 377] and seed-piece protectants and *Gomphrena globosa* was used as an indicator. $HgCl_2$, heliogen, bentonite clay, ethyl alcohol, Na_2CO_3, trisodium phosphate, and $Ca(OH)_2$ were all highly effective inhibitors. Bentonite clay and $Ca(OH)_2$ dusts were good seed-piece protectants, preventing spread from tuber to tuber.

Kozłowska (Aniela). **Detection of latent strains of Potato virus X by ultraviolet light.**—*Amer. Potato J.*, **37**, 7, pp. 237–241, 5 fig., 1960.

This paper, presented to the Potato Ass. of America, Fredericton, Canada, describes studies at Sch. Agric., Cracow, Poland, in which virulent strs. of potato virus X [**30**, 186] inoculated into immature tobacco leaves caused fluorescence of infected areas several days before the appearance of visible lesions [**39**, 238]. Some latent strs. [loc. cit.] produced a characteristic fluorescence of segments of the tobacco leaf veins but others induced no fluorescence at all. It is concluded that the absence of fluorescence in tobacco is not proof of the absence of potato virus X.

Nienhaus (F.). **Test der Mosaikviren Y, X und A unmittelbar von der Kartoffelknolle.** [Test of the mosaic viruses Y, X, and A directly from the Potato tuber.]—*Naturwissenschaften*, **47**, 7, pp. 164–165, 1 fig., 1960.

At Inst. für Pflanzenkrankheiten, Univ. Göttingen, Germany, a highly active virus-inhibitory substance was demonstrated in the cortical zone of potato tubers adjoining the vascular bundles. It prevented the ready demonstration on test plants of viruses in the tuber. By cutting away the outer layers, leaving the tissue with the vascular bundles exposed, and thus eliminating the inhibitor, a 90–100% certain direct transmission was obtained by rubbing the leaves of the test plant (tobacco in this instance) with the prepared potato tuber. This simple method is very economical of space and time.

Klinkowski (M.) & Schmelzer (K.). **A necrotic type of Potato virus Y.**—*Amer. Potato J.*, **37**, 7, pp. 221–228, 6 fig., 1960. [29 ref.]

In this paper, presented to the Potato Ass. of America, Fredericton, Canada, following a survey of the literature dealing with atypical strs. of potato virus Y [**38**, 238; **39**, 623] causing necrotic symptoms on tobacco var. Samsun, it is noted that 2 groups of potato virus Y strs. are differentiated on this host. On potato the strs. all cause the same range of symptoms. When typical and necrotic strs. occur together, the typical ones are preferentially transmitted by aphids.

Orlob (G.) & Bradley (R. H. E.). **Drei weitere Blattlausarten, die das Y-Virus der Kartoffel mit den Stechborstenspitzen übertragen.** [Three more aphid spp. transmitting Potato virus Y on the tips of the stylets.] –*Z. PflKrankh.*, **67**, 7, pp. 407–409, 1960. [Engl. summ.]

At Res. Sta., Canada Dept Agric., Fredericton, N.B., individuals of *Myzus certus*, *Macrosiphum euphorbiae*, and *Aphis nasturtii*, which had acquired potato virus Y during brief probes into tobacco, did not transmit it after being subjected to UV irradiation with the tips of the stylets exposed. While this evidence is not conclusive, it indicates that these spp. carry the virus at the stylet tip, as has been demonstrated for *Myzus persicae* [cf. **35**, 785].

Pohjakallio (O.) & Karhuvaara (Laura). **Resistance to virus diseases of some F_1 clones descended from the species hybridization Solanum demissum × S. tuberosum.**—*Maataloust. Aikakausk.*, **32**, pp. 73–80, 1960. [Finn. summ.]

At Dept Plant Path., Univ. Helsinki, potato var. Rosafolia clones with purple tubers were highly susceptible to potato virus Y, whereas their white bud mutant descendants with white tubers appeared to be completely resistant. Infection expedited the onset of tuber formation and the decline of the haulms in the F_1. Degeneration did not advance from one vegetative generation to the next, but the virus induced a permanent alteration in the rate of development of the plants.

Batenburg (L.) & Goettsch (H. B.). **Specific symptoms in the tubers of mosaic-diseased plants.**—*Europ. Potato J.*, **3**, 3, pp. 229–235, 5 fig., 1960. [Fr., Germ. summ.]

At the Certification Service Centre for Seeds and Seed Potatoes, Barendrecht, Netherlands, typical symptoms were observed in tubers of Eigenheimer, Furore, and Bintje infected by potato stipple streak virus [str. of potato virus Y] and potato virus Y. Light-coloured spots, often with a darker centre, occurred in mosaic-infected tubers and not in healthy ones, and cells in these spots contained less starch than normal tissue.

Wetter (C.) & Völk (J.). **Versuche zur Übertragung der Kartoffelviren M und S durch Myzus persicae Sulz.** [Experiments on the transmission of Potato viruses M and S by *M. persicae*.]—*Europ. Potato J.*, **3**, 2, pp. 158–163, 1960. [Engl., Fr. summ. 18 ref.]

In transmission experiments at Inst. of Virology, Brunswick, Germany, 4 isolates of virus M (leaf rolling mosaic, interveinal mosaic, Fortuna, and D1102) [**39**, 34] were transmissible from var. Saco to *Solanum demissum* by *M. persicae* after 48–72 hr. feeding time, but not the paracrinkle isolate, indicating its similarity with virus S [loc. cit. and below].

Alfieri (S. A.). **Investigations on the resistance to Potato virus S in Solanum tuberosum.**—*Diss. Abstr.*, **20**, 12, p. 4480, 1960.

Serological indexing of 130 samples of field-grown Saco tubers at Cornell Univ. failed to detect any evidence of infection by potato virus S [**36**, 419; **39**, 730], and

all attempts to inoculate the var. with virus S were unsuccessful. Breeding studies showed the inheritance of Saco-type resistance to virus S to be dominant-recessive epistasis.

Köhler (E.). **Die Viren des Kartoffel-Stengelbunt (Tabak-Rattle) und der Pfropfenbildung (Spraing). Eine Stellungnahme zur Frage ihren Verwandtschaft.** [The viruses of Potato stem mottle (Tobacco rattle) and of cork formation (spraing). An attitude to the question of their relationship.]—*NachrBl. dtsch. PflSch Dienst, Stuttgart*, **12**, 6, pp. 87–88, 1960.

Referring to earlier papers on the 2 types of potato stem mottle virus infection in tobacco [**35**, 794; **39**, 264], the author considers that the sap probably contained at least 2 kinds of infectious particles, namely those (*v*) giving systemic infection and those (*h*) giving semi-systemic. He suggests that with undiluted inoculum the *v* particles multiply more rapidly and the resulting premunization of the host tissue prevents or hinders the establishment of the *h* particles. Only when the *h* particles establish themselves without this competition can they cause infection of the semi-systemic type. The question arises whether spraing virus represents particles of the *h* type, which have now partly or wholly lost the ability to give rise to *v* particles, at least in potato. There are apparently no data to indicate that this idea is incorrect, and the author suggests that it be tested by serological methods [cf. **39**, 221, 240].

Lippert (L. F.). **Spindling sprout of Potato tubers associated with a strain of California Aster yellows virus. Strain of Aster yellows virus associated with spindling sprout of Potato**—*Amer. Potato J.*, **37**, 9, pp. 298–305, 4 fig., 1 graph, 1960 [23 ref.]; *Calif. Agric.* **14**, 12, pp. 8–9, 1960.

At Univ. Calif., Riverside, grafting potato scions infected with a str. of aster yellows virus [cf. **39**, 611] to healthy plants in the field caused the production of spindle-sprout tubers [cf. **35**, 841 *et passim*] on those plants grafted 30–86 days after planting: there was no correlation between the production of spindle-sprout tubers and plant symptoms or death. Infected tomato or *Nicotiana rustica* scions were not effective in producing the disorder. In the 2nd paper the same data are interpreted to indicate that spindle sprout results from abnormal development within the phloem, which may be caused by a number of varied conditions or diseases, and should not be considered a separate disease.

Proudfoot (F. G.) & Sproule (T. R. M.). **An improved technique for the isolation of Phytophthora infestans.**—*Europ. Potato J.*, **3**, 2, pp. 155–157, 1960. [Fr., Germ. summ.]

At Plant Breeding Div., Min. Agric., Northern Ireland, healthy tubers of the susceptible var. Craigs Royal were hypodermically inoculated with a suspension of *P. infestans* [**38**, 419] from sporulating leaf-lesions, the sites sealed with collodion, and incubated 10–14 days at 18° C. Cylinders cut out with a 2 cm. cork borer were sliced to give 2 'slopes' which were surface-sterilized in 0·1% $HgCl_2$ for 3 min., washed in sterile distilled water, and transferred to sterile boiling tubes with moist cellulose wadding in the bottom. A good growth of mycelium appeared in 5 days at 18° and was used to inoculate a synthetic medium; pea-meal sucrose medium [**33**, 375] gave excellent growth. Naturally-infected tubers, after being washed and peeled, could also be used to obtain infected cores.

Ciccarone (A.), Black (W.), & Cruz (B. P. B.). **Observações preliminares sôbre as raças de Phytophthora infestans no Estado de São Paulo, Brasil.** [Preliminary observations on the races of *P. infestans* in the State of São Paulo,

Brazil.]—*Arq. Inst. biol., S. Paulo*, **26**, pp. 177–184, 1959. [Engl. summ. Received Nov. 1960.]

Races 4 and 1,4 of *P. infestans* [**38**, 97] were prevalent on potatoes and races 3 and 3,4 on tomatoes, suggesting independence of epiphytotics in these crops. Races 0, 1,3,4, and 2,3,4 were also found but were very limited in distribution. Blight populations in single localities were often mixed and were not influenced in composition by geographical position, though some of the localities were distant and very different climatically. Brazilian isolates belonged to a single compatibility group. The racial composition of the blight populations in São Paulo appears to resemble that of N. America and Europe rather than that of Mexico [cf. **36**, 549] or Peru [**38**, 28], where the number of races is much greater and where there are 2 compatibility groups.

Dionne (L. A.), Graham (K. M.), & Hodgson (W. J.). **The inheritance of resistance to higher races of Phytophthora infestans.**—Abs. in *Amer. Potato J.*, **37**, 10, p. 346, 1960.

Most of the hybrids from immune × susceptible potato crosses had an intermediate level of resistance, since resistance to higher races of *P. infestans* (1,2,3,4,5; 1,2,3,4,6; 1,2,3,4,5,6) was incompletely dominant. The more resistant progeny were almost immune, while the less resistant progeny were like European vars. with field-resistance. The resistance of *S*[*olanum*] *demissum* was retained by suitable crosses to overcome the cytoplasmic male sterility of the *S. demissum* × *S. tuberosum* derivations.

Graham (K. M.), Hodgson (W. A.), & Dionne (L. A.). **Mutability of Phytophthora infestans on blight-resistant selections of Potato and Tomato.**—Abs. in *Amer. Potato J.*, **37**, 10, p. 346, 1960.

When resistant tomato and potato plants were decapitated and lateral buds removed giant succulent leaves were formed which were susceptible to *P. infestans* [**39**, 535]. The fungus also grew on yellowing, old leaves of resistant vars. and when transferred from there to a susceptible host mutant strs. appeared which were capable of attacking the resistant vars. after a series of such alternate passages. Three race shifts were traced in these experiments and it is suggested that mutation to increased virulence may take place on resistant hosts during susceptible phases of growth and this may account for new races in countries where the sexual stage of *P. infestans* has not been found.

Hodgson (W. A.), Dionne (L. A.), & Graham (K. M.). **Laboratory testing for intermediate levels of resistance to Phytophthora infestans.**—Abs. in *Amer. Potato J.*, **37**, 10, p. 347, 1960.

Varietal differences in field resistance were correlated with greenhouse resistance when leaf disks were inoculated with standardized drops of known spore conc. Resistance was shown to be due to 1 or all of 3 factors: (1) resistance to infection, (2) resistance to invasion by the mycelium, or (3) the inhibition of sporulation [cf. **40**, 3]. Resistance varied according to whether the upper or lower leaf surface was inoculated.

Tomiyama (K.). **Some factors affecting the death of hypersensitive Potato plant cells infected by Phytophthora infestans.**—*Phytopath. Z.*, **39**, 2, pp. 134–148, 1 fig., 1 diag., 7 graphs, 1960. [Germ. summ.]

Vital staining with neutral red and observation of protoplasmic streaming at Hokkaido Nat. Agric. Exp. Sta., Sapporo, Japan, showed that the hypersensitive death of cut exposed cells of potato leaf petioles infected by incompatible races

[**39**, 340] took place earlier in those kept for several hr. in air before inoculation than in those inoculated soon after a brief washing of the freshly-cut surface. Intracellular hyphae were still alive at the time of the accelerated, hypersensitive death of the host cell. These results and formerly reported experiments [**37**, 734] in which pre-heat and 2,4-DNP treatment prolonged the hypersensitive death suggest that the latter is hastened by the treatment which accelerates the metabolic activity in the host cells, whereas in cells infected by the compatible races no change occurs when the cut surface is exposed to air for several hr. before inoculation.

In the cells of 5 potato vars. inoculated with compatible and incompatible races of *P. infestans*, the weaker the resistance the longer the time required for hypersensitive death to occur in these cells. These results provide further evidence of the important role of hypersensitivity in disease resistance and the relationship between hypersensitivity and metabolic status of the cytoplasm of each infected cell [**39**, 731].

Marks (G. E.). **Chromosome numbers in Potato cultivars hypersensitive to late blight.**—*Euphytica*, **9**, 2, pp. 254–257, 3 fig., 1960. [Dutch summ.]

At John Innes Inst., Bayfordbury, Hertford, 22 potato cultivars resistant to blight (*Phytophthora* [*infestans*]), all produced from *Solanum demissum* × *S. tuberosum* hybrids [**40**, 123], possessed 48 chromosomes and 2 had 49. The implications of these results are discussed briefly in relation to previous studies and to potato breeding methods. In this material blight resistance is not correlated with aneuploidy, a result which differs from that of Cooper & Howard (*J. Genet.*, **50**, pp. 511–521, 1952). Of the 2 clones with 49 chromosomes listed in the present paper Stelzner 40654/5 is an established cultivar but BC11–5 is not.

Boyd (A. E. W.). **Size of Potato tubers and natural infection with blight and pink rot.**—*Plant Path.*, **9**, 3, pp. 99–101, 1960.

Observations at Edinburgh Sch. Agric. showed that in King Edward smaller tubers are much more susceptible to blight [*Phytophthora infestans*: cf. **33**, 374] than larger ones, so that seed is more susceptible than ware; susceptibility is in inverse ratio to surface area. Variation in infection proved not to be related to the area of tuber surface available for infection.

Susceptibility to blight in relation to tuber size may depend on the degree of tuber maturity at the time of spore contact. Ware tubers were most susceptible to pink rot (*Phytophthora erythroseptica*), as they are to *Fusarium caeruleum* [cf. **32**, 503] and to *Oospora pustulans* [cf. **36**, 720].

Campacci (C. A.) & Santos (C. F. O.). **Fungicidas para contrôle da 'queima da fôlha' de Batatinha.** [Fungicides for the control of 'leaf blight' of Potato.]—*Arq. Inst. biol., S. Paulo*, **26**, pp. 185–195, 1 pl., 1959. [Engl. summ. Received Nov. 1960.]

Of 11 modern fungicides tested in the Alta Sorocabana region of São Paulo, Brazil, against *Alternaria solani* [**38**, 57; **39**, 341], brestan proved the most efficient; the others were inferior and inconsistent. For yield, however, maneb was outstanding, followed by zineb, while brestan and colloidal Cu proved phytotoxic. Dithane M-22 and dithane Z-78 were apparently stimulating. Inconsistent results suggested the possible presence of more than 1 str. of *A. solani*.

Kurbalev (A. M.) & Levshin (I. I.). Рак Картофеля в Хмельницкой области. [Potato wart in the Khmel'nik region.]

Sharikov (K. E.) & Remneva (Mme Z. I.). О вакцинации Картофеля против рака. [On vaccination of Potato against wart.]

Fedotova (Mme T. I.). Определение жизнеспособности возбудителя рака Картофеля. [Determination of the viability of the causal agent of wart.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 8, pp. 47–48; 48–49; 49, 1960.

The 1st paper, from Khmel'nik Quarantine Inspection [Centre], reviews the potato wart [*Synchytrium endobioticum*: cf. **39**, 489] situation in 1948–57, during which period the disease was suppressed in some areas, but increased in others. The practice of using agrotechnical measures only is considered insufficient for control and their supplementation by chemical methods is advocated.

The 2nd paper notes that tubers of a susceptible potato var. inoculated superficially or internally with filtered extracts from fresh crushed warts and diseased tubers and later planted in a heavily infested soil developed approx. the same degree of infection as the uninoculated controls. To establish immunity by protective inoculation is thought impossible.

The 3rd paper reports that under dark field examination live zoosporangia in infested soil displayed light gold luminiscence, whereas the dead ones were dirt-grey and lustreless. Slightly luminous greyish zoosporangia were able to germinate only in favourable conditions. This method, which was quicker than the usual biological tests, is claimed to be also applicable to other pathogens.

Okanenko (A. S.) & Bershteĭn (B. I.). Белки раковых наростов при заражении Картофеля **Synchytrium endobioticum**. [Proteins of warts on Potato infected by *S. endobioticum*.]—*C.R. Acad. Sci. U.R.S.S.*, **134**, 3, pp. 727–730, 1960.

Comparative studies at Ukrainian sci. Res. Inst. for Plant Physiol. of the amino acid content of alkali soluble proteins in healthy tubers and in warts on tubers infected by *S. endobioticum* [cf. **39**, 489] demonstrated the formation in the warts of new proteins differing from those in healthy tubers. Taking into account the comparatively large number of these proteins (alkali soluble and 'residual'), they are considered to develop in the plant as a reaction to the action of the parasite, and are not merely *S. endobioticum* proteins.

Hinzburh [Ginzburg] (D. Z.) & Radz'ko (T. S.). Уплыў структуры хімічных злучэнняў на іх таксічнасць да зааспарангіяў **Synchytrium endobioticum (Schilb.) Perc.** [Effect of the structure of chemical compounds [benzene and its derivatives] on their toxicity to *S. endobioticum*.]—Весці Акад. Нав., Мінск [*Vestsi Akad. Nav., Minsk*], Ser. biol. Sci., *1960*, 3, pp. 31–38, 1960. [Byeloruss. summ. only.]

Nortvedt (J. J.), Fleischfresser (M. H.), Berger (K. C.), & Darling (H. M.). **The relation of soluble manganese to the incidence of common scab in Potatoes.**—Abs. in *Amer. Potato J.*, **37**, 10, p. 350, 1960.

In pot experiments in which potatoes were grown in inoculated sand to which 0–20 p.p.m. soluble Mn [cf. **40**, 244] was added to the nutrient solution, incidence of *Streptomyces scabies* decreased as the Mn uptake increased [cf. **35**, 323].

Schultz (T. H.), Berger (K. C.), Darling (H. M.), & Fleischfresser (M. H.). **Urea formaldehyde concentrate-85 for scab control in Potatoes.**—Abs. in *Amer. Potato J.*, **37**, 10, pp. 351–352, 1960.

In field experiments in 1958 and 1959 on several different soil types excellent control of scab [*Streptomyces scabies*: see above] was given by UFC–85 at 30–40 gal./acre in the rows or broadcast at 100–150 gal./acre. Higher dosages were slightly phytotoxic and delayed emergence, while lower ones were ineffective: UFC–85 contains 26% urea and 60% formaldehyde and tends to release the formaldehyde slowly; it also contains about 1 lb. N/gal.

Boyd (A. E. W.). **Fungicidal dipping and other treatments of seed Potatoes in Scotland.**—*Europ. Potato J.*, **3**, 2, pp. 137–154, 1960. [Fr., Germ. summ. 13 ref.]

An account is given of experimental treatments at Castleton, Eassie, Angus, where seed potatoes, graded after a preliminary washing of the lifted tubers, are treated on a commercial scale by washing immediately under high pressure, and then propelling them slowly for 12 min. through an organo-Hg dip (70–140 p.p.m. Hg.), after which excess moisture is removed by absorbent rollers and the tubers are then dried in boxes. For 2 successive yr. this treatment of King Edward and Doon Star has controlled dry rot (*Fusarium caeruleum*), skin spot (*Oospora pustulans*), and gangrene (*Phoma foveata*) [cf. **38**, 667]. Disease incidence was further reduced by subsequent well-ventilated storage at a low temp. The organo-Hg treatment, or even washing alone, stimulated sprouting, which was reflected in further yield increases.

Bonde (R.) & Hyland (Fay). **Effects of antibiotic and fungicidal treatments on wound periderm formation, plant emergence, and yields produced by cut seed Potatoes.**—*Amer. Potato J.*, **37**, 9, pp. 279–288, 5 fig., 1960.

At Maine agric. Exp. Sta., Orono, the rate and extent of wound periderm formation was reduced by treating freshly-cut Katahdin seed potatoes with 100 p.p.m. agrimycin, which also reduced bacterial decay [**36**, 348]. A combined agrimycin and captan treatment, though increasing the susceptibility of cut pieces to surface moulds and *Fusarium* spp., did not affect the size of the subsequent crop in these experiments, but might do so under soil or climatic conditions favouring decay.

Robinson (D. B.), Ayers (G. W.), & Campbell (J. E.). **Chemical control of blackleg, dry rot, and Verticillium wilt of Potato.**—*Amer. Potato J.*, **37**, 6, pp. 203–212, 1 fig., 1960.

Trials with 16 chemicals at Canada Dept Agric., Charlottetown, P.E.I., for control of these diseases are described. Blackleg (*Erwinia atroseptica*) of potato seed-pieces was usually controlled by $HgCl_2$, agristrep, or semesan bel. Dry rot (*Fusarium caeruleum* and *F. sambucinum* f. 6 [*Gibberella cyanogena*]) and wilt (*Verticillium alboatrum*) in seed stocks were controlled by acid $HgCl_2$ or semesan bel, and dry rot in stored potatoes by the latter or agrimycin 500 (42·4% Cu). $HgCl_2$ was always phytotoxic and semesan bel sometimes, but under good cultural conditions semesan bel gave adequate disease control without adversely affecting the crop.

Robbs (C. F.). **Estudos sôbre as doenças 'canela preta' e 'podridão mole' da Batatinha.** [Studies on the diseases 'black leg' and 'soft rot' of Potato.]—*Rev. Agric. Piracicaba*, **35**, 2, pp. 91–95, 1960.

Pectobacterium carotovorum [*Erwinia carotovora*] and *P. atrosepticum* [*E. atroseptica*] were isolated from potato materials submitted to Escola Nacional de Agronomia, Univ. Rural, Rio de Janeiro, from various regions of Brazil. Inoculation tests demonstrated that *E. carotovora* was primarily responsible for producing the dark pigment characteristic of black leg [cf. **29**, 276; **33**, 73], but further studies will be required before final conclusions are reached.

Nielsen (L. W.) & Haynes (F. L.). **Resistance in Solanum tuberosum to Pseudomonas solanacearum.**—*Amer. Potato J.*, **37**, 8, pp. 260–267, 2 fig., 1 graph, 1960.

Field inoculation tests with a large number of foreign and domestic potato breeding clones at N. Carol. agric. Exp. Sta., Raleigh, revealed a type of resistance to *P. solanacearum* [cf. **36**, 718] in clones 2117–117 and Prisca in which symptom

appearance was delayed and the disease developed slowly. This resistance was heritable, but crossing resistant clones of different genetical background gave no individuals with a better resistance than the parents.

MacLachlan (D. S.). **Disinfectants and Potato ring rot control.**—*Amer. Potato J.*, **37**, 10, pp. 325–337, 2 fig., 1960.

At Canada Dept Agric., Central exp. Farm, Ottawa, the best disinfectants for cutting knives were $HgCl_2$ (1:500) and semesan bel (1 lb./4 gal.). Jute, wood, and metal surfaces were disinfested from *Corynebacterium sepedonicum* [**39**, 733 *et passim*] by quaternary NH_3 compounds (alkyl tolyl methyl trimethyl ammonium chloride formulations), and contaminated potato bags were successfully treated in hyamine 2389 (Rohm & Haas; 300 p.p.m.), 250 bags/40 gal. Some of the seed piece disinfectants tested reduced ring rot but cannot be recommended owing to phytotoxicity.

Coppenet (M.) & Calvez (Mme J.). **Observation d'un cas d'intoxication manganique de la Pomme de Terre sur sol très acide.** [Study of a case of manganese toxicity of Potato in very acid soil.]—*C.R. Acad. Agric. Fr.*, **46**, 12, pp. 728–733, 3 fig., 1960.

A pot experiment at Sta. d'Agronomie I.N.R.A., Quimper, France, with var. B.F. 15 in Apr. 1959 showed that excess soluble Mn [cf. **29**, 474] produced circular, necrotic spots of 1–2 mm. diam. on the leaves towards the end of May, partial leaf fall in June, and total defoliation except for the small terminal leaves by the end of the growing season. In the pot to which $MnSO_4$ was added (3 g. 10 kg. soil), the pH was 4·5 and the exchangeable Mn 14·4 p.p.m.

Dinkel (D. H.). **A study of factors influencing the development of hollow heart in Irish Cobbler Potatoes (Solanum tuberosum L.).**—*Diss. Abstr.*, **21**, 1, pp. 14–15, 1960.

A study of various factors in field and greenhouse at Univ. Minn. in 1958 and 1959 led to the conclusion that hollow heart [cf. **35**, 227] appears to result when the environmental conditions which cause the development of brown spot [**39**, 618] occur at an early stage of tuber development, and are followed by conditions leading to rapid growth in tubers capable of a fast rate of expansion. A smooth transition from top growth to tuber initiation and enlargement without flushes of excessive top growth seems to be necessary for the production of tubers free from hollow heart.

Newsam (A.). **Pathological Division.**—*Rep. Rubb. Res. Inst. Malaya, 1959*, pp. 60–66, 1960.

Further experiments [cf. **40**, 62] showed that rubber root disease (*Fomes lignosus*, *F. noxius*, *Ganoderma applanatum*) in a replanting can be reduced if the stump surfaces of old stands are treated with a wood preservative. When lengths of naturally infected root were used as inocula in the bole, *F. lignosus* and *F. noxius* grew more rapidly inwards than outwards. In a high proportion of 122 4-yr.-old trees inoculated with *F. lignosus* infection eventually failed to become established; the inoculated roots of 25 (8-yr.-old) were all alive after 2 yr.

Sporophore formation in *F. lignosus* cultures was induced by allowing the fungus to colonize a wood block which was then surrounded by soil. Automatic volumetric spore trapping indicated that large numbers of *G. pseudoferreum* spores are in the air. Attempts to infect freshly cut stump surfaces with fresh spores of *F. lignosus* failed.

Though sodium arsenite poisoned jungle trees more quickly than 2,4,5-T, the latter induced a more rapid decay.

Power-operated knapsack mist blowers proved fully satisfactory as a means of applying fungicides against *Helminthosporium heveae*; ferbam and ziram formulations showed promise.

Ratoon stunting disease.—*S. Afr. Sug. J.*, **44**, 8, pp. 674–675, 3 fig., 2 graphs, 1960.

Ratoon stunting [virus] is generally believed to be one of the factors concerned in Natal [**38**, 486] in the deterioration of N:Co.310 and other valuable sugar-cane vars., which is specially prevalent in areas affected by the drought of 1959. In one experiment, since the local discovery of the disease in 1953, to determine its effects on yield [**35**, 721] decrease in Co.281 was progressively larger from plant cane to the 3rd ratoon crop, whereas the reductions in N:Co.310 and N:Co.334 were more consistent in each of the 4 crops, with means of 18 and 19%, respectively. In another test, however, the mean decrease in 3 crops of N:Co.334 was 41%.

In an experiment on Ecca shale in the Inyoni district of Zululand the combined effects of inferior soil conditions, drought, and ratoon stunting caused a mean decrease in tons acre of 33% in both Co.331 and N:Co.310, while further evidence of intolerance of the virus in N:Co.334 was also obtained.

The most alarming feature of the results, however, was the reaction of N:Co.376, the 1st ratoon crop of which was reduced by up to 60%. In the 1st experiment referred to above the mean decrease in 4 crops of this var. was 33%, 42% reduction occurring in the 3rd ratoon.

Ratoon stunting is considered to offer a very real threat to the productivity of most of the best vars., and it will continue to do so unless the effective remedy of hot-water treatment of the seed cane is generally adopted.

Jenkins (Anna E.) & Bitancourt (A. A.). **Notas sôbre as antracnoses maculadas X–Antracnose maculada da Cana de Açúcar.** [Notes on the spot anthracnoses X Spot anthracnose of Sugarcane.]—*Biológico*, **26**, 6, pp. 111–113, 1 fig., 1960.

The agent of spot anthracnose of sugarcane [cf. **35**, 723] is thought to be frequently confused with other leaf pathogens of the same host, but there are unmistakable differentiating characters. For instance, the leaf spots are smaller (0·2–1 × 0·1–0·5 mm. or up to 3 × 1 mm. when isolated); they are almost exclusively epiphyllous; and the tissues surrounding the oval, lime-white lesions are dark wine coloured. The smaller spots are perceptible only by reason of the halo; when they are numerous the haloes coalesce, imparting a red tinge to the leaf.

The oldest specimen examined was collected in the Philippines by W. D. Pierce, who designated the disease 'white rash'. In 1957 S. C. Arruda observed the same condition on var. C.B.38 22 at Piracicaba, São Paulo, Brazil, and referred it to *Elsinoe* (verbal communication). Among samples received from the National Fungus Collections, Beltsville, Md, was one of *Leptosphaeria sacchari* collected by B. A. Bourne at Canal Point, Fla, in 1929 [cf. **39**, 498]. The fungus described by Lo from Formosa in 1957 as *Sphaceloma sacchari* n. sp. (*J. Agric. For.* (*Taiwan*), **6**, pp. 70–74, 1957) is believed to represent the imperfect state of Arruda's *E.* sp. It is only the 2nd sp. of *E.* to be found on a monocotyledon [cf. **26**, 565] and the 1st on a member of the Gramineae. Its present distribution, based on the collections so far investigated, comprises, besides the above-mentioned locations, Puerto Rico, Guam, Marshall Is., and Truk Is., while a specimen recently received from Haiti presents somewhat similar symptoms to those of Lo's 'white speck'.

Rangaswami (G.). **Studies on two bacterial diseases of Sugarcane.**—*Curr. Sci.*, **29**, 8, pp. 318–319, 1 fig., 1960.

Xanthomonas [*Pseudomonas*] *rubrilineans* [cf. **36**, 127] and *X. vasculorum* [map 3] were observed on sugarcane in Madras State in 1958, the latter possibly a new

record for India. At Dept Agric., Annamalai Univ., Annamalainagar, inoculations demonstrated that sorghum and *Pennisetum typhoideum* are hosts of *Pseudomonas rubrilineans*, also *Pennisetum antidotale* and *Brachiaria mutica*, which proved to be new hosts for *X. vasculorum* as well.

Venkata Ram (C. S.). **Foliar application of nutrients and rhizosphere microflora of Camellia sinensis.**—*Nature, Lond.*, **187**, 4737, pp. 621–622, 1960.

Four sprays at 2-day intervals with 10 ml. aliquots of nutrient solutions were applied at the Tea Exp. Sta., Devarchola, S. India, to 1-yr.-old tea plants grown in pots of field soil; 4 days later the rhizosphere soil was sampled for population counts. Whereas the number of bacteria decreased after sprays with any of the solutions tested that of fungi increased following 0·28 M Na_2HPO_4 or 0·67 M KCl, and decreased after 0·04 M Mg SO_4. With N from different sources 1·47 M $NaNO_3$ caused no significant change in the fungi, which were significantly decreased by 0·83 M urea and 0·76 M $(NH_4)_2$ SO_4.

Wildman (S. G.) & Ford (C. V.). **Time of appearance and size of local lesions produced by two strains of Tobacco mosaic virus.**—*Phytopathology*, **50**, 9, pp. 677–680, 2 graphs, 1960.

In further work at Dept Bot., Univ. Calif., Los Angeles [**37**, 183], comparisons were made of the time taken for 50% of the lesions to develop on detached leaves of *Nicotiana glutinosa* inoculated with the U1 and U2 strs. of TMV [**39**, 42] and with the nucleic acids extracted from each str. A 4-hr. difference was found between the strs. (U2 first) and between their nucleic acids at 20° C. Lesions from the nucleic acids appeared 1–3 hr. earlier than those from their corresponding viruses. A rise of 10° delayed the development of U1 lesions but not that of U2. The U1 lesions were slightly larger on 1st appearance than were those of U2, and apparently required the collapse of more TMV-infected cells.

Wu (J.-H.) & Rappaport (I.). **Competition between two strains of Tobacco mosaic virus (TMV) on leaves of Nicotiana glutinosa.**—Abs. in *Phytopathology*, **50**, 9, p. 659, 1960.

Str. U1 [see above] and a mild related str. VM producing smaller lesions were used on leaves of *N. glutinosa*. When U1 infections were irradiated with UV there was an exponential decrease in U1 lesions, but not when mixed infections were irradiated. A model for the interference between these 2 strs. was developed following analysis of the resuscitation of U1 lesions after irradiation.

Goodchild (D.). **The effect of light on the synthesis of Tobacco mosaic virus.**—*J. Aust. Inst. agric. Sci.*, **26**, 3, p. 283, 1960.

This summary of a thesis presented to Univ. Sydney reports that more local lesions of tobacco mosaic virus (TMV) developed on *Nicotiana glutinosa* and *Datura stramonium* in light than in dark, and with increasing light from none to 950 ft. candles. The depression of lesion numbers by darkness resolved itself into a major effect, unaffected by temp. and a minor, which persisted after the former. The time of action of the major effect was correlated with the short time period after inoculation when the sensitivity of the strs. to UV light remains constant [cf. above]. Low intensity green light had the same effect as darkness. Virus movement from cell to cell increased in darkness, while the amount of virus development/unit area was similar in light and dark.

In the systemic host tobacco the inhibition by darkness of TMV formed in young leaves was correlated with the small amount of cytoplasmic leaf protein produced.

Krylov (A. V.), Smirnova (Mme V. A.), & Tarakanova (Mme G. A.). Влияние света различного спектрального состава на репродукцию вируса Табачной мозаики. [The effect of light of different spectral composition on the reproduction of Tobacco mosaic virus.] –*C.R. Acad. Sci. U.R.S.S.*, **133**, 4, pp. 973–975, 1 pl., 1 graph, 1960.

The results of tests at K. A. Timiryazev Inst. Plant Physiol. and Electron Microscope Lab., Dept biol. Sci., Acad. Sci. U.S.S.R., on leaves of Mamont tobacco infected by TMV indicated that the accumulation of viruses in plants is closely connected with the spectral composition of light [cf. above]. Large-scale infection of hothouse plants by viruses may be due to the fact that light penetrating the hothouse is deprived of ultra-violet. Irradiation may, therefore, prevent or sharply reduce infection.

Berger (P.). **Bericht über eine Sitzung der Wissenschaftlichen Kommission der CORESTA über aktuelle Probleme der Virologie des Tabaks.** [Report on a session of the Scientific Committee of CORESTA on current problems of Tobacco virology.] –*Ber. Inst. Tabakforsch. Dresden*, **7**, 1, pp. 103–114, 1960. [Russ., Engl. summ.]

The author's lecture, at a meeting at Acad. agric. Sci., Berlin, 18 Dec. 1959, of representatives of Virus Res. Institutes in Germany, France, Italy, Netherlands, and Greece, is concerned almost exclusively with the practical applications of tobacco virology, especially in relation to 3 viruses: the symptoms of the 3 variable forms of potato virus Y [**39**, 623] and rattle [stem-mottle virus: **38**, 331], and of 4 of mosaic are described.

Despite the continuously extending knowledge of the internal structure of viruses, satisfactory methods for their identification from field isolates are still awaiting development. Specialized research on the epiphytotic spread of tobacco viroses and their diagnosis demands international co-operation, for which reason a permanent working group has been set up by the Scientific Committee of CORESTA.

Marcelli (E.). **A proposito di una variante necrotica del virus Y della Patata.** [On a necrotic variant of Potato virus Y.]—*Tabacco, Roma*, **64**, 695, pp. 158–168, 3 pl. (23 fig.), 1960. [Engl. summ. 13 ref.]

In 1958 Burley tobacco growing near Pontecagnano, Italy, developed a diffuse chlorosis with marked necrosis of the primary and secondary veins, found to be due to a necrotic str. of potato virus Y [cf. **39**, 242; **40**, 63], a new record for Italy. In 1959 the disease was epidemic in tobacco under gauze, especially when close to potato plantings, numerous nearby. The development elsewhere of potato vars. resistant to the virus [cf. **37**, 421] is briefly reviewed.

Wark (D. C.), Hill (A. V.), Mandryk (M.), & Cruickshank (I. A. M.). **Differentiation in Peronospora tabacina Adam.**—*Nature, Lond.*, **187**, 4738, pp. 710–711, 1 fig., 1960.

Inoculation tests by C.S.I.R.O., Canberra, showed that more tobacco seedlings of the 7 lines examined were susceptible to Canberra isolates of *P. tabacina* [**39**, 500] (given a sporulation intensity index 100) than to those from N. Queensland (index 44.1), and more seedlings of 13 *Nicotiana* spp. to Canberra isolates than to the W. Australian (54.9). The differences in pathogenicity range, host reaction, and reproductive capacity thus indicated at least 3 ecotypes of the fungus, significant in breeding for resistance.

Berger (P.). **Über das Auftreten von Peronospora tabacina Adam in einigen Tabakbeständen der Deutschen Demokratischen Republik.** [On the occurrence

of *P. tabacina* in some Tobacco stands of the German Democratic Republic.]—*Ber. Inst. Tabakforsch. Dresden*, **7**, 1, pp. 70–80, 2 fig., 1 map, 1960. [Russ., Engl. summ.]

In connexion with the appearance of blue mould for the 1st time in Mecklenburg in Sept. 1959 [**40**, 127] the author summarizes and discusses essential information on the disease and its control. Details are given of the reported distribution.

Zogg (H.). **Der Blauschimmel des Tabaks, eine neue Krankheit in Europa.** [Blue mould of Tobacco, a new disease in Europe.]—*Mitt. Schweiz. Landw.*, **8**, 9, pp. 136–141, 8 fig., 1960.

Peronspora tabacina [map 23] is reported for the 1st time in Switzerland from the Eidg. Landw. Versuchsanst., Zürich. From its 1st appearance in the Netherlands and Germany [see above] the disease spread from mid-June 1960 onwards in an explosive fashion in Germany, France (Pas-de-Calais, Bas-Rhin, Haut-Rhin), Belgium, and Switzerland. The 1st reports in Switzerland came from the north of Zürich on 20 July, particularly from the Flaach district, where a severe outbreak had at this date already covered an area of ca. 100 ha. In Aug. the disease was detected in Altstätten (St. Gallen), on 11 Aug. in Ajoie, on 15 Aug. in the Rhone plain (Wallis), in Felsberg (Rhine valley, Graubunden), and finally on 16 Aug. in Tessin (Magadino plain). By 22 Aug. practically all the Swiss tobacco areas were infected.

Smyk (B.), Różycki (E.), & Urbaniak (A.). **Studia nad biologią i występowaniem czarnej zgorzeli korzeniowej Tytoniu (Thielaviopsis basicola (Berk. & Br.) Ferr.) w Polsce.** [Studies on the biology and distribution in Poland of black root rot of Tobacco (*T. basicola*).]—*Zesz. nauk. wyższ. Szkol. rol., Kraków, 1960*, 10, Agric. 7, pp. 159–181, 9 fig., 1 map, 1960. [Engl., Russ. summ. 33 ref.]

Three strs. of *T. basicola* [**36**, 492, 620] were noted at High Sch. Agric., Cracow, viz. grey on Virginia skroniowska and Burley skroniowski all over Poland, black on Kentucky 3002, Virginia Joyner, and White Burley in the Lublin and Kielce areas, and brown on Virginia vars. in the Cracow area. The disease threatens particularly the Lublin, Kielce and Cracow areas, which are the main growing regions.

Ivancheva-Gabrovska (Todora). Устойчивост на някои сортове и видове Тютюн спрямо черното кореново гниене **(Thielaviopsis basicola (Berkeley) Ferraris).** [Resistance of some Tobacco varieties and species to black root rot (*T. basicola*).]—Раст. Защ. [*Rast. Zasht.*], **8**, 3, pp. 15–30, 1960. [Russ., Engl. summ. 16 ref.]

A report from Inst. Plant Prot., Sofia, Bulgaria, that in experiments by Tobacco Exp. Sta., Rila, the results of which are tabulated, all the tobacco vars. tested were susceptible to varying degrees [cf. **39**, 501]. Of the other *Nicotiana* spp., *N. rusticana*, though immune, occasionally had chlamydospores on the roots. Some vars. of *N. alata*, *N. paniculata*, and *N. sanderae* were immune, but *N. alata* var. *purpurea* and some strs. of *N. glutinosa*, *N. langsdorfii*, *N. longiflora*, *N. nostiflora*, and *N. silvestris* were highly susceptible. The pathogen also infected to a varied extent groundnut, watermelon, melon, cotton, anise, bean [*Phaseolus vulgaris*], and cucumber.

Barat (H.) & Baudin (P.). **Pourriture des feuilles de Tabac au séchoir.** [Rotting of Tobacco leaves in the drying shed.]—*Bull. Inst. Rech. agron. Madagascar* 3 (*1959*), pp. 147–150, 2 fig., 2 graphs, 1 map, 1960.

After stating that in Betsiriry, S.W. Madagascar, Maryland tobacco leaves hanging in the drying sheds become affected by barn rot (*Rhizopus nigricans*) [*R. stolonifer*: **40**, 185], the authors discuss the factors predisposing to infection. Further research into chemical factors inducing susceptibility is required.

Anders (F.) & Vester (F.). **Genetisch bedingte Tumoren und der Gehalt an freien Aminosäuren bei Nicotiana.** [Genetically induced tumours and the content of free amino acids in *N.*]—*Experientia*, **16**, 2, pp. 65–67, 2 graphs, 1960. [Engl. summ.]

At Zoologisches Inst. and Inst. für organische Chemie, Univ. Saarlandes, Saarbrücken, Germany, the amphidiploid hybrid of *N. glauca*×*N. langsdorffii*, which produces tumours spontaneously [**9**, 797], was found to contain more of the following free amino acids than the non-tumour-forming parent spp.: cystine, histamine, oxyproline, alanine, kynurenine, tryptophane, and an unidentified ninhydrin-positive substance. It is presumed that the abnormally high levels of these compounds are connected with the process of tumour formation.

[An amplified version of this paper is presented in *Biochem. Z.*, **332**, 4, pp. 396–402, 1 fig., 2 graphs, 1960.]

Sutton (W. S.). **A vascular necrosis of Tomato roots.**—*J. Aust. Inst. agric. Sci.*, **26**, 3, pp. 278–280, 2 fig., 1960.

Since 1947 tomatoes in unheated greenhouses in Sydney, N.S.W., have suffered severely from drop head wilt [**38**, 120]. A characteristic vascular necrosis in the root makes field diagnosis of the disease possible; in the early stages a thin brown necrotic ring in the region of the outer vascular system and the pericycle can be seen macroscopically in cross-section. The causal virus is sap-transmissible and from the host range, physical properties, serology, and cross protection properties is thought to be a hitherto undescribed tobacco mosaic virus str.

Flores (Elza), Silberschmidt (K.), & Kramer (M.). **Observações de 'clorose infecciosa' das Malváceas em Tomateiros do campo.** [Studies on 'infectious chlorosis' of Malvaceae in field Tomatoes.]—*Biológico*, **26**, 4, pp. 65–69, 4 fig., 1960. [Engl. summ.]

Leaves of tomato plants grown in a field station of the Inst. Biológico, São Paulo, Brazil, developed pale spots with diffuse outline between the secondary veins. Transmission of the disease by grafting and by *Bemisia tabaci* to tomato, tobacco, and *Sida rhombifolia* suggests that the agent is the virus of infectious chlorosis of Malvaceae [Abutilon infectious variegation virus: **38**, 733].

Teterevnikova-Babayan (Mme D. N.), Ananyan (A. A.), Egiazaryan (A. G.), & Gasparyan (N. A.). О влиянии органо-минеральных удобрений на развитие фузариального увядания Помидоров. [On the effect of organo-mineral fertilizers on the development of *Fusarium* wilt of Tomatoes.]—*Nauch. Trud. erevansk. Univ.*, Ser. biol. Sci., **64**, 7, pp. 93–104, 1958. [Arm. summ.]

In tests in 1954–56 at the Armenian Sub-Sta., All-Union sci. Res. Inst. Canning and Dry Vegetable Industry, though mineral fertilizers (NPK) and organic+mineral fertilizers (NPK+25 centner humus) increased yields, in plots with NPK alone there was 17·5–24·8% *Fusarium* wilt [*F. bulbigenum* var. *lycopersici*: cf. **35**, 795] in 1954–5, 14·3–16·9% without fertilizer, and 15·2–20·6% with NPK+humus. Large doses of K (76 kg. ha. and over) and their early application depressed infection. Single applications of a 1% ammonium nitrate solution with or without superphosphate in a 10% suspension or root manuring with superphosphate and KCl depressed wilt development. Early use of large doses of P inhibited the appearance of field symptoms and thus reduced damage.

Butler (E. E.). **Pathogenicity and taxonomy of Geotrichum candidum.**—*Phytopathology*, **50**, 9, pp. 665–672, 18 fig., 1960. [27 ref.]

At Univ. Calif., Davis, isolates of *G. candidum* [**38**, 547; **39**, 706], the causal agent of tomato watery rot, from sources including tomato, muskmelon, milk, and

sewage, were pathogenic to ripe and mature green tomato fruits. Mature green fruits on the plant or harvested in Aug. were resistant; those picked in Oct.–Nov. were susceptible to some isolates. Resistant green fruits kept at 0–5° C. for 7–10 days became susceptible. *G. candidum* was pathogenic to peach and watermelon in inoculation tests and causes a field rot of muskmelon in Calif.; immature fruits of squash and cucumber and potato tubers were not infected.

Nayudu (M. V.) & Walker (J. C.). **Physiology of bacterial spot of Tomato.** — Abs. in *Phytopathology*, **50**, 9, p. 648, 1960.

In media containing NH_4Cl as the N source growth of *Xanthomonas vesicatoria* [**39**, 739] was inhibited by Cu, Fe, Mn and Zn, and favoured by Ca. Yeast extract and vitamin-free hydrolysed casein reversed the inhibition. Of 17 amino acids, glutamic supported the best growth but was inferior to hydrolysed casein. The balance of amino acids in tomato plants, which is affected by ageing, temp., and nutrition, is suggested as a factor conditioning the development of bacterial spot.

Egan (H.) & Lidzey (R. G.). **Phenylmercury salicylate residues in commercial glasshouse Tomato crops.**—*Plant Path.*, **9**, 3, pp. 88–91, 1 graph, 1960.

Analyses at D.S.I.R., Lab. Government Chemist, London [**40**, 77], of fruit from 40 commercial tomato crops treated with phenyl mercury salicylate aerosols [**36**, 480] in England, Wales, and Guernsey in 1959 indicated that when the aerosol is applied at the recommended rate of not over 40 mg. of organically combined Hg/1,000 cu. ft. glasshouse space/application at intervals of 6–10 days, the total Hg residue expressed as p.p.m. on the whole fruit is not likely to exceed 0·01 $(n+1)$, where n (total no. of applications) does not exceed 8 [cf. **39**, 720].

Koval' (É. Z.). Грибные болезни древесных и кустарниковых пород в городах Приморья. [Fungus diseases of trees and shrubs in the towns of Primor'e.] — Бюлл. глав. бот. Сада, Москва [*Byull. glav. bot. Sada, Moskva*], *1960*, 37, pp. 85–92, 1960.

This account by the Far E. Branch, Siberian Dept Acad. Sci. U.S.S.R., sums up the results of observations in Vladivostok, Artem, Suchan, and Nakhodka in 1955–8, which revealed the occurrence of about 250 spp. on 60 hosts. A note may be made of the following: white leaf spot (*Phyllosticta platanoides*) on *Acer mandshuricum* and *A. mono*, new host records; *Cytospora pruinosa* [cf. **37**, 422] causing systemic infection in *Fraxinus americana* (approx. 45% incidence); leaf rust (*Puccinia festucae*) attacking almost all the *Lonicera chrysantha* and *L. ruprechtiana* shrubs in the Artem park; *C. chrysosperma* [*Valsa sordida*: **39**, 128] producing lesions usually on the south-facing side of *Populus alba*, *P. koreana*, and *P. pyramidalis* stems, which suggests the possibility of sun burns acting as channels for infection; stem rot of *P.* spp. due to *Ganoderma applanatum*, *Funalia* [*Polystictus*] *trogii*, and *Irpex lacteus*; and black leaf spot (*Gnomoniella oharan*) on *Ulmus pumila*. Suggestions for control are given with lists of generally resistant and generally susceptible trees and shrubs.

Krasov (L. I.). Обзор грибных болезней деревьев и кустарников в ростовском ботаническом саду. [A review of fungus diseases of trees and shrubs in the Rostov Botanical Garden.]—Бюлл. глав. бот. Сада, Москва [*Byull. glav. bot. Sada, Moskva*], *1960*, 87, pp. 100–103, 1960.

A review of the studies by Rostov-on-Don State Univ., U.S.S.R., initiated in 1951. Mentioned are, *inter alia*, 'burn' of plum (*Polystigma rubrum*), noticed almost every year since the epidemics of 1952; Dutch elm disease [*Ceratocystis ulmi*: cf. **39**, 248], which in many tracts has become epiphytotic; and *Daedalea quercina* [on oak], first observed during the rainy summer of 1958.

RUNOV (E. V.) & ZHDANNIKOVA (Mme E. N.). Микрофлора ризосферы Березы и Ели на различных почвах средней тайги Вологодской области. [The microflora of the rhizosphere of Birch and Spruce in different soils of the central taiga of the Vologod region.]—Сообщ. Лаб. Лесовед. [*Soobshch. Lab. Lesoved.*], *1960*, 2, pp. 69–79, 7 graphs, 1960.

Results of work during 1956–58 in areas of peat-humus, podzol, and peat bog in the Mitinskiĭ Forestry Establishment, Kharovsk area, are presented. The rhizosphere microflora was found to be determined by the tree and the soil type. In peat-humus and podzol birch rhizospheres were more profusely colonized by micro-organisms than those of spruce. Noticeable differences were also noted in the relationship of physiological groups of micro-organisms. There was also a seasonal variation in the quantitative composition. The adaptation of trees to the conditions of habitat is also reflected in the rhizosphere microflora.

DADANT (R.). **Pourriture de l'écorce des Albizzia stipulata à Madagascar.** [Bark rot of *A. stipulata* in Madagascar.]—*Bull. Inst. Rech. agron. Madagascar* 3 (*1959*), pp. 84–85, 2 fig., 1960.

This information on a disease caused by *Phytophthora* [*drechsleri*] has been noticed [**39**, 442].

ARRETINI (C.). **Esperienze di lotta contro il cancro corticale del Castagno in provincia di Avellino.** [Experiments on the control of bark canker of Chestnut in the province of Avellino.]—*Monti e Boschi*, **10**, 12, pp. 628–633, 1959. [*For Abstr.*, **21**, 3, p. 441, 1960.]

Castanea mollissima [**40**, 191] offers no solution after 10 yr. of experiment to the problem of *Endothia parasitica* [cf. **36**, 218] on chestnut in Italy, as it is unsuited to the climate, poorer in growth than *C. sativa*, and produces inferior fruit. Better results might be expected by selecting resistant individuals of *C. sativa*.

RIDÉ (M.) & GUDIN (C.). **Sur la biologie de quelques champignons parasites de la Châtaigne et plus particulièrement de Phoma endogena (Speg.).** [On the biology of some fungi parasitic on Chestnuts and more particularly of *P. endogena*.]—*C.R. Acad. Agric. Fr.*, **46**, 9, pp. 536–543, 1960.

Most of this information on the biology of *Sclerotinia pseudotuberosa* and *P. endogena* in relation to the infection of chestnuts in France has been noticed [**39**, 505].

PESANTE (A.). **Il 'seccume' del Nocciolo Gentile delle Langhe.** [The withering of Gentile delle Langhe Hazel Nut trees.]—*Riv. Fruttic.*, **22**, 3, pp. 241–251, 6 fig., 1960.

A full description is given of the symptoms of the serious decline of hazel nut trees [*Corylus avellana*] in the Langhe area of Piedmont, Italy, for at least 30 yr.; it has become progressively more widespread there during the past 10 yr. [cf. **32**, 287] and hardly a planting is unaffected. All attempts to inoculate healthy unwounded and wounded *C. avellana* trees with *Cytospora corylicola* [cf. **37**, 322] were negative. The author considers that the condition is probably due to a virus. Investigations are in progress.

KOCHMAN (J.). **O nowych dla Polski mączniakach prawdziwych.** [On true mildews new to Poland.]—*Acta agrobot.*, **9**, 2, pp. 89–97, 2 graphs, 1960. [Engl. summ.]

An account from Inst. Phytopath. S.G.G.W., Warsaw, of *Uncinula aceris* on *Acer negundo* in the Warsaw and Puławy areas and of *Microsphaera silvatica* on oak [cf. **37**, 318], which has been observed near Warsaw since 1952.

NEELY (D.) & HIMELICK (E. B.). **The early leaf and twig blight stage of Sycamore anthracnose.**—Abs. in *Phytopathology*, **50**, 9, p. 648, 1960.

The assumption that external infections by *Gnomonia veneta* [*G. platani*] are responsible for early symptoms on sycamore [*Platanus occidentalis*: **39**, 630] is shown to be incorrect; the pathogen overwinters as internal mycelium round bud bases, producing cankers as the new leaves are expanding. Blight appeared when surface-sterilized buds were covered with cellophane to prevent outside infection: *G. platani* was isolated from twig sections $\frac{1}{2}$ in. above and 1 in. below infected buds.

SCHÖNHAR (S.). **Spritzversuche gegen Dothichiza populea mit verschiedenen Fungiziden.** [Spray trials against *D. populea* with various fungicides.]—Reprinted from *Allg. Forstz., 1959*, 47, 2 pp., 1959.

In further spray trials [**39**, 354] in several districts in 1957 and 1958 by the Baden-Württ. Forstliche Versuchs- und Forschungsanstalt., Stuttgart, 0·5% aqueous solutions of Cu oxychloride (50% Cu), a basic Cu salt (27%), and copper oxide (35%) were the most effective against *D. populea* on poplar; 3 applications were given at approx. 2–3 months interval [**39**, 507].

DAVIDSON (R. W.), HINDS (T. E.), & HAWKSWORTH (F. G.). **Decay of Aspen in Colorado.**—*Sta. Pap. Rocky Mtn For. Exp. Sta.* 45, 14 pp., 1959. [*For. Abstr.*, **21**, 3, p. 440, 1960.]

Examination of 976 *Populus tremuloides* > 4 in. diam. from 5 national forests revealed decay in 53% of the trees, accounting for 8·4% of their gross vol. In 50-yr.-old stands decay (in cu. ft.) averaged < 2%, and in 100-yr. stands, 4, 8, and 13% for Baker's site classes 1, 2, and 3, respectively. The fungi identified (of 17 spp.) accounted for about $\frac{2}{3}$ of the total decay value. *Cryptochaete polygonia* [**37**, 602] was the fungus most frequently isolated (28% of identified infections), but the greatest loss of volume was due to *Fomes igniarius* var. *populinus* [**38**, 717] (59% of the decay associated with identified infections). Most of the butt rot was caused by *Collybia velutipes*, *F. applanatus* [*Ganoderma applanatum*], and *Pholiota squarrosa*. *C. velutipes* was associated with the largest vol. of butt decay and was also the most frequently isolated butt-rot fungus. *G. applanatum* is important, as it is a root parasite and its presence may lead to windthrow.

HUBBES (M.). **Systematische und physiologische Untersuchungen an Valsaceen auf Weiden.** [Systematic and physiological studies of Valsaceae on Willows.]—*Phytopath. Z.*, **39**, 1, pp. 65–93, 6 fig., 5 diag., 1960. [50 ref. Engl. summ.]

A study of *Valsa*, *Leucostoma*, and *Valsella* spp. on willows [**31**, 523] at the Inst. für spezielle Botanik, Eidg. Technische Hochschule, Zürich, demonstrated many distinct strs. and transitional forms. *Valsa sordida*, *V. germanica*, and *V. salicina* are regarded as synonyms of *V. ambiens*. The other sp. recognized is *V. ceratosperma*. *L. nivea* (syn. *L. auerswaldii*), *L. translucens*, *Valsella fertilis* (syn. *V. salicis*), and *V. nigro-annulata* are recognized as distinct spp. The colour of the mycelium, utilization of sugars, growth rate, growth factor requirements, and toxin formation are characteristics of particular strs. and cannot be used for delimitation of spp. All strs. studied were pathogenic on 8 willow spp. and on *Populus tremula* × *P. tremuloides*. The differences in pathogenicity are considerable.

BLOOMBERG (W. J.) & FUNK (A.). **Willow blight in British Columbia.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **16**, 5, pp. 3–4, 1960.

Several ornamental willows in the arboretum at Univ. B.C. have been affected by *Fusicladium saliciperdum* since summer, 1958. The disease, not recorded in B.C. since 1941 [**21**, 172], is first evident as a blackening of the youngest leaves, then

a black lesion encircles and kills the shoot, until eventually whole branches are killed. In severely affected trees $\frac{1}{3}$ of the crown has been destroyed.

Guseva (Mme A. N.). Корневая губка и меры борьбы с ней. [Butt rot and control measures.]—Лес. Хоз. [*Les. Khoz.*], **12**, 1, pp. 42–44, 1 fig., 1960.

Information is given on aspects of the biology of butt rot [? *Fomes annosus*: **38**, 231] obtained during studies of its distribution in the forests and conifer plantations of the Moscow district, where in recent yr. incidence has reached 60–80–100%. Observation confirmed that in some geographical conditions the surface type was most common, while in others the underground type prevailed. Both types, however, can occur together. In the Moscow region surface fruit bodies are very rarely formed. Recommendations are made for control on the basis of the literature. Mixed forests are advocated.

Moreau (R.) & Schaeffer (R.). **De la maladie du rond et des moyens de lutter contre elle.** [On ring disease and its control.]—*Bull. Soc. for. Franche-Comté*, **29**, 8, pp. 436–442, 1959. [*For. Abstr.*, **21**, 3, pp. 439–440, 1960.]

To test Rishbeth's findings on the inhibition by *Trichoderma* and *Penicillium* spp. of infection of pines by *Fomes annosus* [**39**, 252], the authors conducted a study of the microflora of the soil and rhizosphere in spruce stands in the department of Doubs, France, (a) free from *F. annosus*; (b) slightly infested; and (c) severely infested. The results showed that in (a) only a small proportion of the bacteria present (as compared with (b) and (c)) were spore-forming, while in the 3 soils the number of fungi present were, respectively, 0·6, 0·26, and 0·11 millions/g. soil, this progressive decrease being particularly striking in the case of *P.* and *T.* spp. These trends were even more marked in the rhizosphere.

Öhlmann (J.). **Mykologische und Feuchtigkeitsuntersuchungen an einer vom Kiefernbaumschwamm befallenen Kiefer.** [Mycological and moisture investigations on a Pine trunk attacked by *Fomes pini*.]—*Arch. Forstw.*, **8**, 3, pp. 270–284, 1959. [*For. Abstr.*, **21**, 3, p. 440, 1960.]

In a 109-yr.-old pine bearing a small sporophore of *F. pini* at a height of 4·25 m. penetration by the fungus went much farther up than down the trunk from the infection site and spread out radially only to a slight extent. Wood moisture content within the affected heartwood increased with the intensity of attack. Wood already attacked by *F. pini* was more susceptible than healthy wood to attack by *Merulius domesticus* [*M. lacrymans*], *Poria vaporaria*, and *Coniophora cerebella* [*C. puteana*], but less so than healthy sapwood.

Hirt (R. R.). **Pinus strobus L. A literature review and discussion of its fungus diseases in North America.**—*Tech. Publ. N.Y. St. Coll. For.* 82, 90 pp., 1959. [*For. Abstr.*, **21**, 3, p. 438, 1960.]

This review includes sections on mycorrhiza, staining, and silvicultural practices to reduce disease.

Küthe (K.). **Mehrjährige Erfahrungen bei der Bekämpfung der Kieferschütte (Lophodermium pinastri) in Hessen.** [Many years' experiences in the control of Pine needle cast (*L. pinastri*) in Hessen.]—*Gesunde Pflanzen*, **11**, 8, pp. 145–151, 1 fig., 1 graph, 1960.

At Hessen-Nassau Plant Prot. Office, Giessen, Germany, a correctly timed single or double treatment of young pine stands against *L. pinastri* [**40**, 67] with Cu (dust or spray), Cu+zineb, brestan, or zineb (dust or spray) reduced heavy infection from 61 to 5%. Zineb-treated tracts rated 65% healthy seedlings, as compared with 9% in the untreated. Main shoots grew by 50–100% longer in treated stands.

The chemicals were applied by knapsack sprayers, both ordinary and motor-driven, and the total cost for zineb was approx. 35 DM./ha.

Schütt (P.). **Beobachtungen zur Biologie der Kiefernschütte.** [Observations on the biology of needlecast of Pine.]—*NachrBl. dtsch. PflSchDienst, Stuttgart*, **12**, 6, pp. 85–87, 1 fig., 1 graph, 1960. [Engl. summ.]

At Inst. für Forstgenetik und Forstpflanzenzüchtung der Bundesforschungsanstalt für Forst- und Holzwirtschaft, Schmalenbeck, needles naturally infected by *Lophodermium pinastri* [**39**, 635] were examined for spore discharge in the laboratory. Checks with freshly collected needles at various times indicated that the laboratory performance was a reliable indication of that in the field. Both in 1957 and in 1958 there was a period of approx. 3 months (May–July) during which the spores failed to germinate satisfactorily, even though climatic conditions were favourable. Numerous viable spores were discharged at all other times of the year. When needles bearing apothecia were placed in a moist chamber (100% R.H; 20° C.) the spores which germinated most rapidly were those discharged within 36–48 hr., and it is recommended that these be used in infection experiments.

Moss (V. D.), Viche (H. J.), & Klomparens (W.). **Antibiotic treatment of Western White Pine infected with blister rust.**—*J. For.*, **58**, 9, pp. 691–695, 4 fig., 1960. [16 ref.]

A detailed description of field practice in spraying the basal portions of the trunks and the proximal ends of attached branches of *Pinus monticola* with actidione BR to control *Cronartium ribicola* in the northern Rocky Mountains, U.S.A. [**37**, 686].

Moriondo (F.). **La 'ruggine vescicolosa' del Pino.** [Blister rust of Pine.]—*Monti e Boschi*, **11**, 2, pp. 72–77, 1960. [*For. Abstr.*, **21**, 3, pp. 441–442, 1960.]

A description of the pine disease caused by *Cronartium asclepiadeum* [cf. **39**, 636] in Italy, where it is recorded on *Pinus sylvestris*, *P. nigra*, *P. pinaster*, and *P. halepensis*. There is no record of attack on *P. picea* [*Picea abies*], even when growing close to an outbreak.

Newhook (F. J.). **Climate and soil type in relation to Phytophthora attack on Pine trees.**—*Proc. N.Z. ecol. Soc.*, **7**, pp. 14–15, 1960.

This information has been noticed [**39**, 249].

Björkman (E.). **Ny svampsjukdom i skogsträdsplantskolor.** [A new fungus disease in forest nurseries.]—*Skogen*, **46**, 14, pp. 292–293, 1959. [*For., Abstr.*, **21**, 3, p. 439, 1960.]

Serious losses in pine have been caused in Norrland [Sweden] by *Scleroderris* (*Crumenula*) *abietina* [cf. **36**, 290]. Research on control is in progress.

Weresub (Luella K.) & Gibson (Shelagh). **'Stereum pini' in North America.**—*Canad. J. Bot.*, **38**, 5, pp. 833–867, 4 pl. (12 fig.), 7 fig., 5 diag., 1960. [44 ref.]

In further studies at Canada Dept Agric., Ottawa [cf. **35**, 498], reported in detail, interfertility tests and the morphology of the mycelium suggested that *S. pini* from America and Europe, and *Peniophora duplex* from America should be considered as *P. pini* agg., including *P. pini* ssp. *pini* (of Europe), and *P. pini* ssp. *duplex* 'stat.' nov. and *P. pseudo-pini* nom. nov. (both of N. America).

Briscoe (C. B.). **Early results of mycorrhizal inoculation of Pine in Puerto Rico.**—*Caribbean For.*, **20**, 3–4, pp. 73–77, 5 fig., 1 graph, 1959.

Since 1955, work at the trop. For. Res. Center, Rio Piedras, Puerto Rico, has been concentrated on the establishment of [unspecified] mycorrhizal fungi in introduced

pines. Three methods which have proved successful are application of inoculum to established seedlings (*Pinus elliottii*); importation of inoculated seedlings (*P. elliottii, P. taeda*); and inoculation in the seedbed (*P. caribaea*). Vigorous pine seedlings are now established on 20 sites.

Saksena (H. K.) & Vaartaja (O.). **Descriptions of new species of Rhizoctonia.**—*Canad. J. Bot.*, **38**, 6, pp. 931–943, 1 pl. (11 fig.), 13 fig., 1960.

In studies of 60 of some 700 isolates of *Rhizoctonia* from forest nurseries in Sask. and Man. by the For. Biol. Div. Canada Dept Agric., Ottawa, and the Canada Agric. Res. Sta., Saskatoon, 4 new spp. and 1 new var. are described, viz: *R. dichotoma* on spruce, *R. endophytica* and *R. globularis* on pine and spruce, and *R. endophytica* var. *filicata* and *R. hiemalis* on pine.

Schönhar (S.). **Eine Nadelerkrankung der Fichte.** [A needle disease of Spruce.]—Reprinted from *Allg. Forstz., 1959*, 49, 1 p., 1959.

A report, from Abteilung Phytopathologie der Bad.-Württ. Forstl. Versuchs- und Forschungsanstalt, of *Rhizosphaera kalkhoffii* affecting 8–20-yr.-old stands of spruce at Tiengen and Stühlingen in Südbaden. First symptoms, occurring in late summer or autumn, are a yellow flecking of needles on the young shoots. These needles later turn pale brown and then rusty red, and fall in autumn, winter, or spring. The disease starts on the lower branches and progresses upwards. Trees in a given stand vary considerably in susceptibility. The disease is serious in damp hollows and on shaded slopes [cf. **36**, 799].

Although the pathogen appears generally of little importance in Central Europe, in the localities mentioned the disease has been steadily spreading since 1956, and there is a possibility that many of the trees will slowly die off.

Jacquiot (C.). **Contribution à l'étude de quelques espèces affinés de la série des igniaires. I. Phellinus robustus Karst., P. hartigii Allesch. et Schn., P. fulvus (Scop.) Pat.** [A contribution to the study of some closely related species of the *igniarius* series. I. *Fomes robustus, F. hartigii, F. fulvus.*]—*Bull. Soc. mycol. Fr.*, **76**, 1, pp. 83–106, 2 pl. (10 fig.), 3 fig., 1 diag., 1 graph, 1960. [25 ref.]

Some of this information has been noticed [**39**, 133]. After noting the confusion concerning the taxonomy of forms near *F. igniarius* [cf. Pilát, **31**, 257] the author describes his morphological and physiological studies. These showed that on carrot or malt agar *F. hartigii* has closely septate hyphae with many vesiculose articulations and forms typical chlamydospores, often very abundantly. The aerial mycelium is very sparse, growth is slow, and the lignolytic effect is not marked.

F. robustus never forms chlamydospores, develops vesiculose articulations only at a very late stage of growth, and they are confined to certain areas of the colony. The intraligneous mycelium has no swollen articulations. On agar the colony as a whole forms a thick mat, which in colouring [loc. cit.] is very different from *F. hartigii*. The close adaptation of *F. robustus* to oak and chestnut is shown by the length of time required before it actively decomposes deal, not usually very resistant to fungi. It is a well-characterized parasite but not very virulent. *F. hartigii* merits specific rank.

Comparison in culture with *F. fulvus*, which by reason of the characters of its carpophore comes near to *F. igniarius*, revealed further distinctive characters separating *F. fulvus* from *F. robustus* and *F. hartigii*.

Puri (Y. N.). **A note on the decay resistance test of Ghana timbers.**—*Indian For.*, **86**, 10, pp. 621–622, 1960.

In block tests on malt agar to determine resistance to decay by *Polyporus* [*Poly-*

stictus] *versicolor* [**36**, 433] of 20 spp. of timber from Ghana at the Forest Path. Branch, Forest Res. Inst., Dehra Dun, *Mimusops heckelii*, *Cyclodiscus gabunensis*, *Mansonia altissima*, *Nouclea diderrichii*, and *Afrormosia elata* were classified as very durable.

LUMSDEN (G. Q.). **Fortified wood preservative for Southern Pine poles.**—*For. Prod. J.*, **10**, 9, pp. 456–462, 1 fig., 5 graphs, 1960.

The object of this work at Bell Telephone Labs., Inc., Murray Hill, N.J., was to reduce the risk of early failure due to low retention in poles creosoted at the 8 lb. retention level, without increasing the risk of bleeding. The problem was solved by adding to the coal tar creosote a supplement of pentachlorophenol [cf. **39**, 639] at 2% by wt., which gave a 40% improvement in toxic efficiency, demonstrated by laboratory soil block tests with *Lentinus lepideus* and *Lenzites trabea* and confirmed by outdoor tests since 1953 with $\frac{3}{4}$ in. sapwood stakes.

NIEUWHOF (M.). **Internal tipburn in White Cabbage. I. Variety trials.**—*Euphytica*, **9**, 2, pp. 203–208, 4 fig., 1 graph, 1960. [Dutch summ.]

At Inst. hort. Plant Breeding, Wageningen, Netherlands, the Dutch autumn vars. Success and Glory of Enkhuizen were little susceptible to internal tipburn [cf. **37**, 125], whereas Langedijker Autumn White was highly susceptible. There were clear differences in this respect between strs. of the latter var. The disorder may be associated with the water régime of the plant. However, there was no correlation between the amount of wrapper leaves (as a measure of the size of the transpiration surface) and the degree of tipburn. The observed differences in the amounts of tipburn are correlated with different growth rates. Presumably when growth has been rapid the resulting weak tissue may constitute an important factor of susceptibility.

BURCKHARDT (F.). **Beobachtungen über das Auftreten von Virosen an Kohl- und Stoppelrüben im Jahre 1959.** [Observations on the occurrence of virus diseases of Swede and Turnip in 1959.]–*NachrBl. dtsch. PflSchDienst, Stuttgart*, **12**, 7, pp. 104–106, 2 fig., 1 map, 1960. [Engl. summ.]

Crinkle mosaic virus infection of main crop swedes [? turnip mosaic virus: cf. **38**, 109] was widespread in Westphalia and Schleswig-Holstein in 1959, sometimes with severe symptoms, but on 2nd crop swedes and turnips symptoms were only occasional and weak. Turnip yellows virus infected swede occasionally in Schleswig-Holstein, and frequently in Westphalia, where it also caused an epidemic in turnips.

POHJAKALLIO (O.), HALKILAHTI (ANNA MARJA), & ANTILA (S.). **On the effects of the club root fungus (Plasmodiophora brassicae Woron.) and winter frost on the overwintering of winter Turnip Rape.**—*Maataloust. Aikakausk.*, **31**, pp. 198–206, 4 fig., 1959. [Finn. summ.]

A summary of the results of field trials during 1951–54 at Vilk Exp. Farm, S. Finland, which clearly demonstrated the adverse influence of the pathogen on the winter-hardiness of the crop [cf. **36**, 7].

WHITESIDE (J. O.). **Diseases of legume crops in Southern Rhodesia.**—*Proc. Conf. Prof. Offrs Dept Res. & Specialist Serv.*, **4**, pp. 52–57, 1960.

In this contribution to the conference on Legumes in Rhodesian Agriculture, at Univ. Coll. Rhod. & Nyasld., June, 1959, diseases of sunnhemp, velvet bean, cowpea, soybean, *Dolichos lablab*, *Canavalia ensiformis*, pigeon pea, *Crotalaria ochroleuca*, lucerne, groundnuts, beans (*Phaseolus vulgaris*), and peas are listed, with descriptions and methods of control for the more important.

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